Notebook Series -- Notebooks by Edison
Notebook, N-14-01-01.2

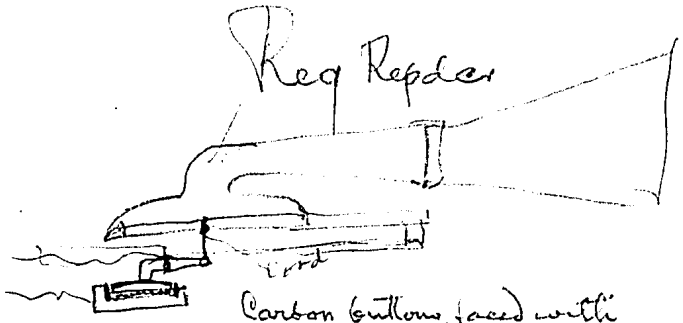
This notebook was used by Edison during the periods January-March 1914 and October 1916, partly at his West Orange laboratory and partly at his winter home in Fort Myers, Florida. The entries from 1914 pertain primarily to sound recording and amplification. Included are notes on modifications to musical instruments, phonograph horns, recording diaphragms, and reproducers, as well as notes on various chalk telephone and electromotograph devices to try in connection with recording. Also included are references to works by Herman von Helmholtz, Lord Rayleigh, John Tyndall, and other authorities on acoustics. One drawing involves studio arrangements for making kinetophone films and recordings. Another suggests making a hearing apparatus for the deaf. The entries from 1916 relate to Edison's research for the U.S. Navy during World War I. Included are notes that propose methods for detecting battleships and submarines, taking infrared photographs, and cooling machine guns. Other entries pertain to trench warfare, combating chemical warfare, bombs, air reconnaissance, inter-ship communication, and possible means for disabling submarine periscopes. The front cover is marked "Telephone Recording Navy." The pages are unnumbered. Approximately 135 pages have been used.

Jany 1 1914

Recording on phono
by interposing telephone
& other Expts on phono

Jany 1 1914

Reg Reader

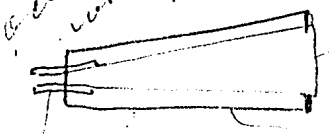


Carbon bellows, faced with Lamp black, also elastic fine fabrics bellows. fabrics coated lamp black

Jany 1 1914

How working of conical funnel with glass

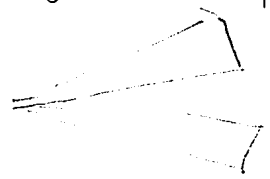
D must be made to work for the necessary



Cone funnel shellacked inside 1" board box surrounding it —

glass colanyprassum high —

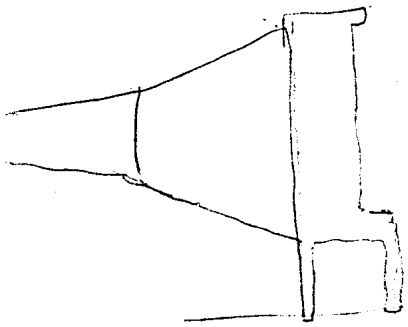
or neat Cement - very fine & pumped against a highly packed heavy bed



Note
2 ft & 4 ft
funnels

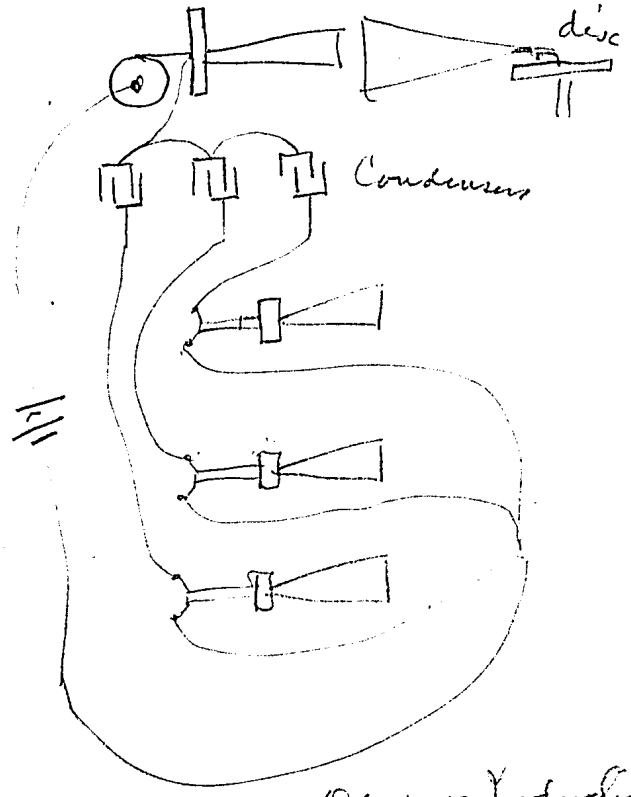
Note of long funnel
less slump —

Jany 1 1914

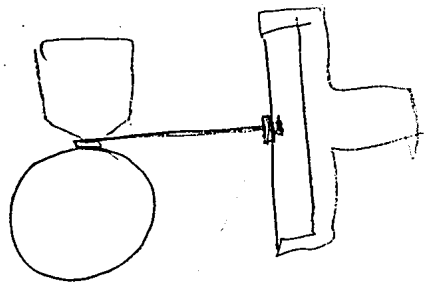


upright piano
funnel to tone
at back mounted
of the board
& closed front

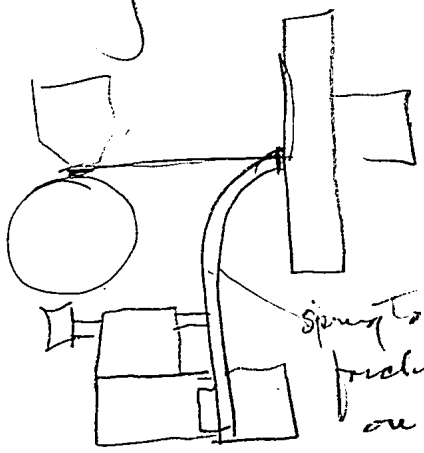
To prevent doubles
put stop hammer on
Rep hammer lake
on knocking machine
of Model Lake —



Or use Induction Coil –



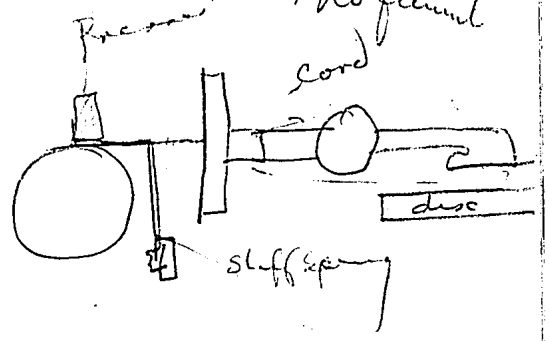
felt connection to
Dia or equivalent to
String

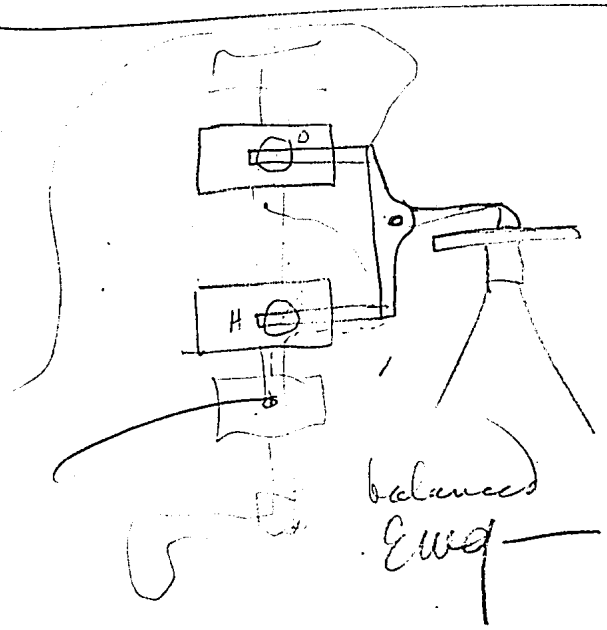


spring to balance
friction pull
on Diaphr

Jany 1 1914

No found
cord





balanced
Ewd

4) 72 -
18 -

20

180 -

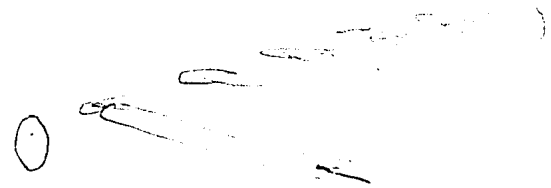
60) 72 (12
60
12

12 sec

60) 72 (1.2
60
12

1.2 sec heart
12 seconds breathe
6 ½ breath

Jany 1 1914



Cant a flute be made that would get rid of our pounds at hole - & be blown from compressed air — use compressed air a central air tube, or a slit by lips

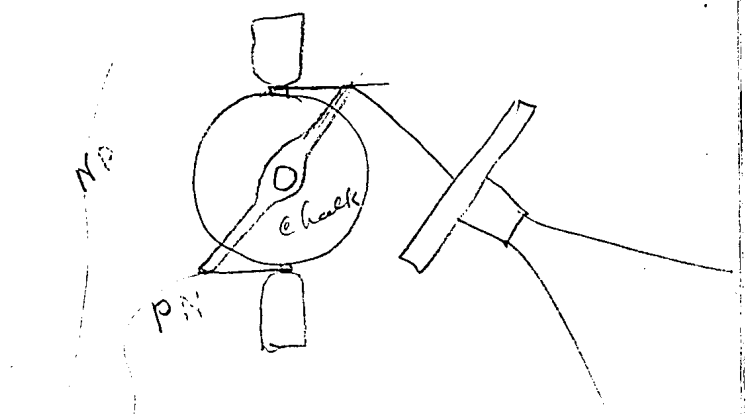
Tremolo is produced by the unequal strength of vocal chords or edges one 256 other 259 - recall 3 beats - try equal pressing throat on a tremolo singer

Jany 1 1914

Funnel notes

64 V.6 sec		
128 "	52.5	4.37
256 "	26.25	2.181
512	13.125	1.19
1024	6.562	
2048	3 281	
4096	1.64	
8192	0.82	
	0.41	

If a violin played accompd by a Violin 1 octave higher or from less (beats would not be heard) they cease to be heard at 120 difference

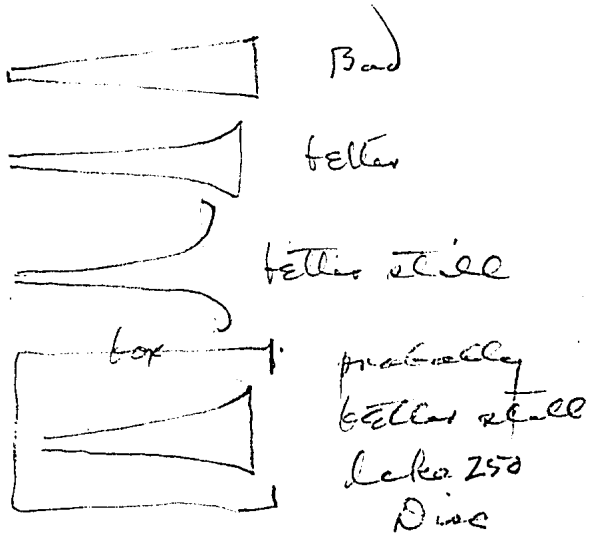


possibly double resistance will not increase volume –

If So – then can connect

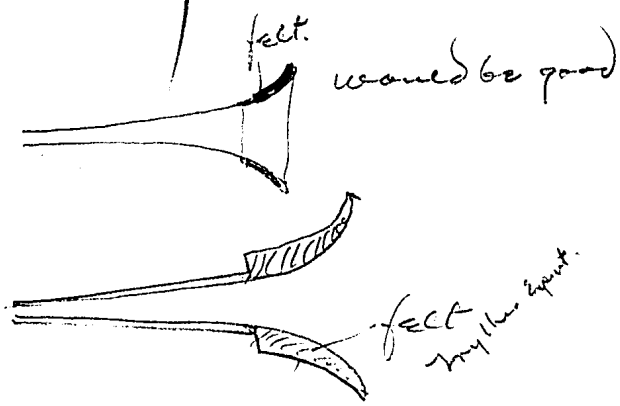
Multiplier

In funnels of all
kinds the sudden letting
out of waves at sharp
edge of funnel is bad -
a new ~~[illegible]~~ whirl is set
up - it tends to sharpen
waves & also to cause
the whirl to give an extra
wave to those in front

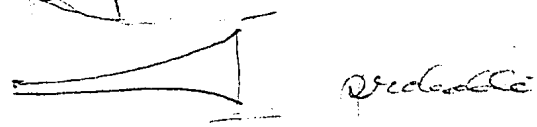


July 2 1914

Probably



This would let woods pass Cornets very softly –



Velocity sound agr of the Indian
only applies to outdoors
in closed hall where
constrained its duration
minus loss of heat or
friction —

To find natural tone
of a room, sound the
scale or equivalent.
Recording room with
all appliances should
have their natural
note recorded

Raleigh say Vol 11. p 68
ft note

I have underground passage
4 wide 6½ high - by singing
right note to excite vibration
I obtain free vibrations of
many seconds duration
and often happen the
resonant note is
affected with distinct
BEATS.

See Raleigh Vol 11
page 102 funnels
Very powerful

Raleigh says a hoop
Membrane is acted on both sides
by sound waves as thus
underwater ~~[illegible]~~ insensitive but
if its big enough for wave length
to form a shadow. Its sensitive
perhaps our Dia recorder
should have a shield for
low notes-

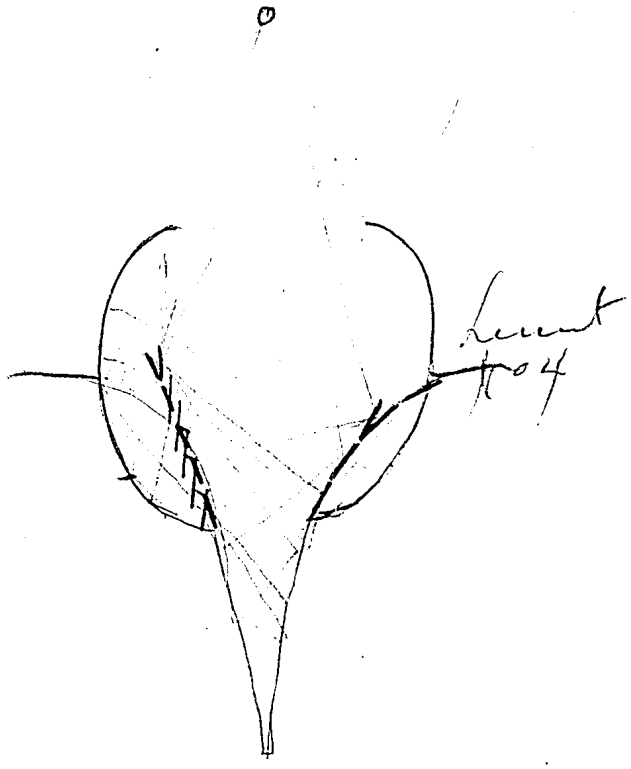


Fig 04

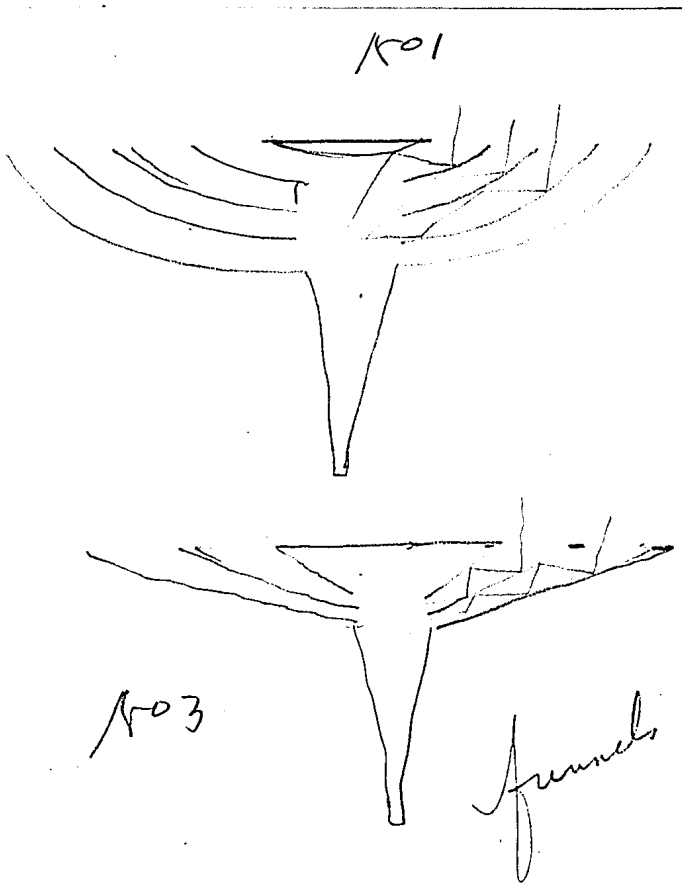
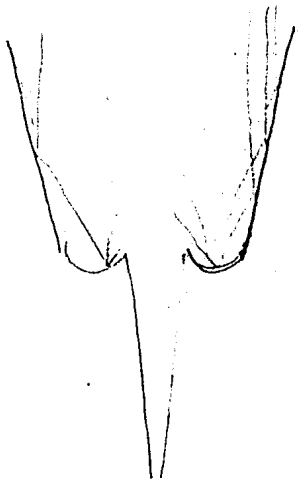
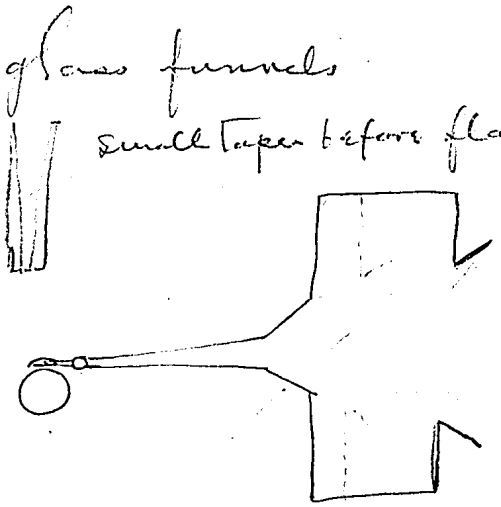


Fig 01
Fig 03



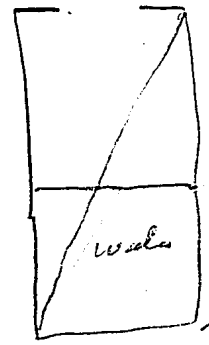
Get glass funnels

small taper before flare



Sven Chamber Monhegan

Resonator of this is Middle C

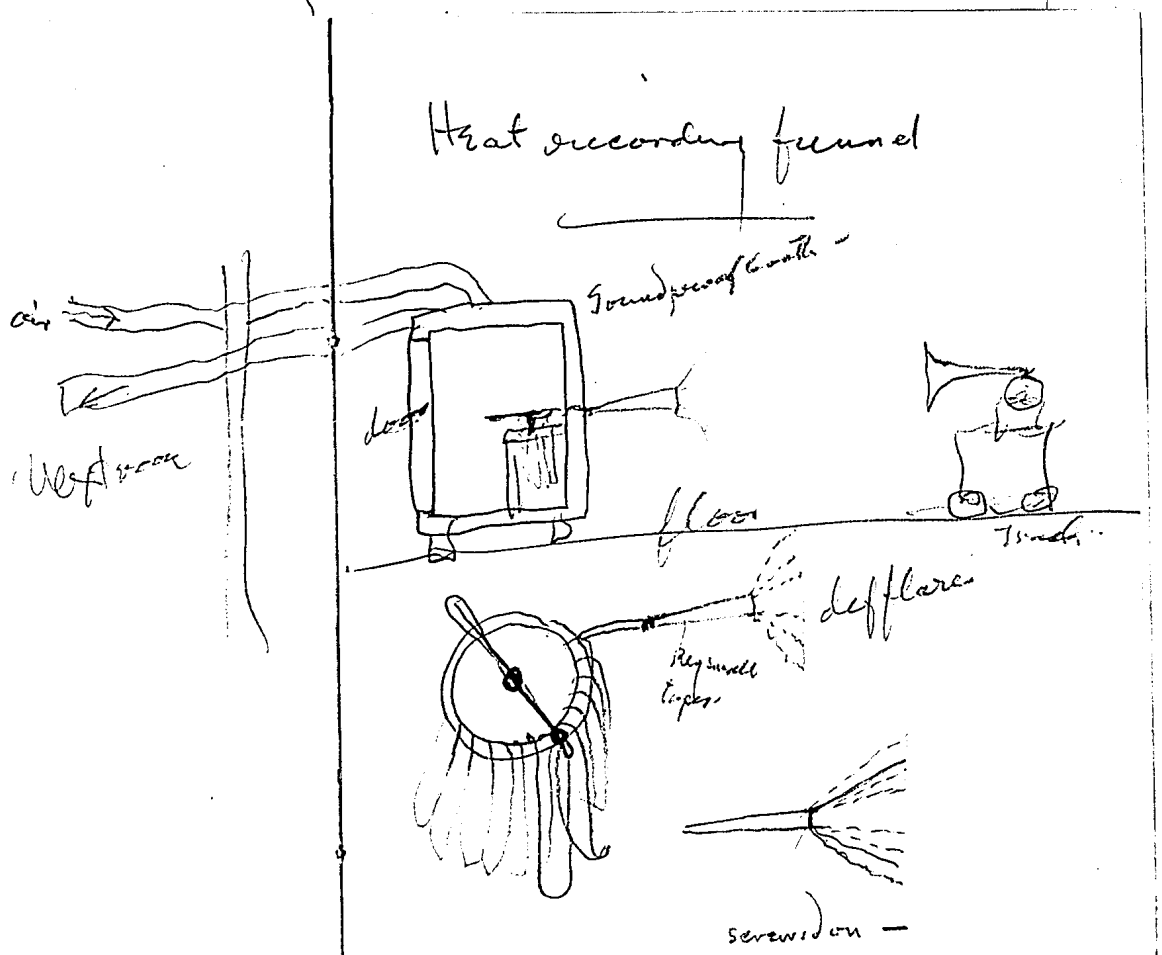


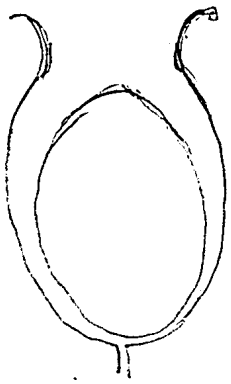
pitch not altered by making the Resonator

It depends on The Volume mainly & making it not change the Volume

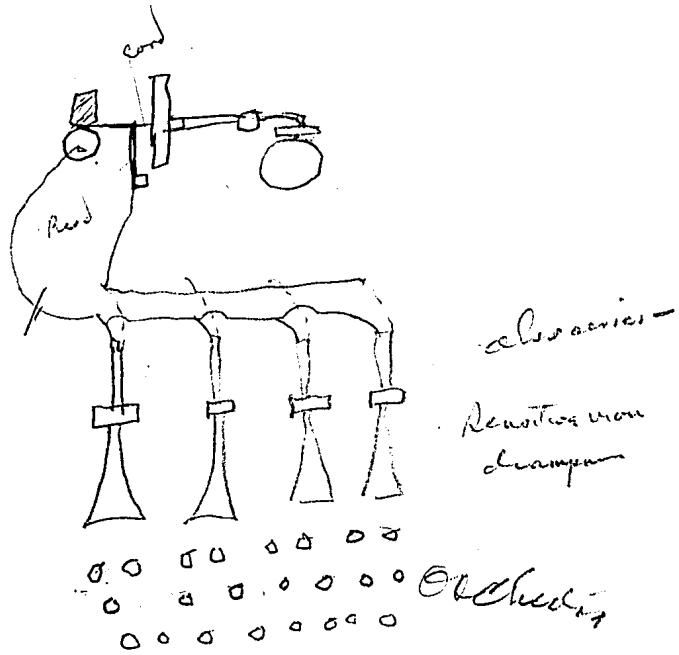
For substitute for celluloid
Submission -

Make semihard rub -
Pure Para - Sulphur +
Load with pure
Paraffine -
+ Vulcanize -


Heat according funnel
air
Soundproof Cloth
door
floor
defflares
screwidon

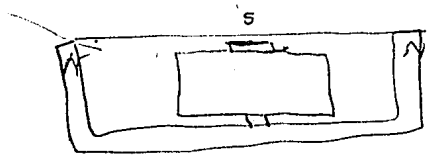


In winding magnets
use the acetocellulose insulation
to give less retardation —
or other insulation, better
Remember our old Induction
Coils Spark depended on insulation.



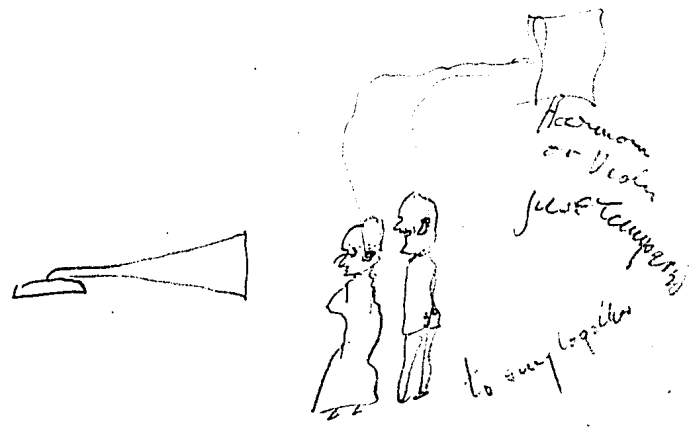
also Carbon transmitter

best I think



NOTE

Diaphrms fastened at Edges, the Sound box must be same Coef of Expansion to get even results

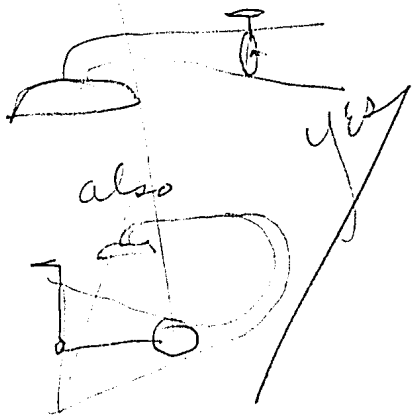


Alum or Mg Carbs

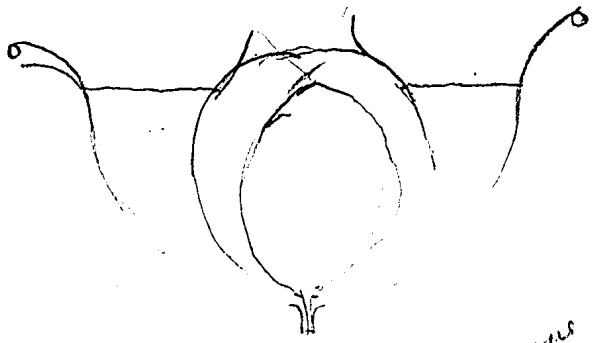
Diaphrms with fixed Edges

Cupric Cellulose
Infusible Condensate
Condensite Dual Varnish
Leather - Sesame oil def 6/4
Microcellulose - Acetate
Viscose - Glass, Mica Schist K
Electrolytic films Ni Fe Cu Co
Ag Al Zn Cd Sb
Ammonite Copper - Silk
Shellac - Japan paper
Gelatin - Carbon
German Silver - Metals Langer Dia

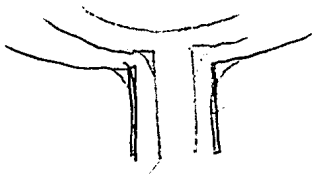
Did I patent!



Use taper like small point Reg found



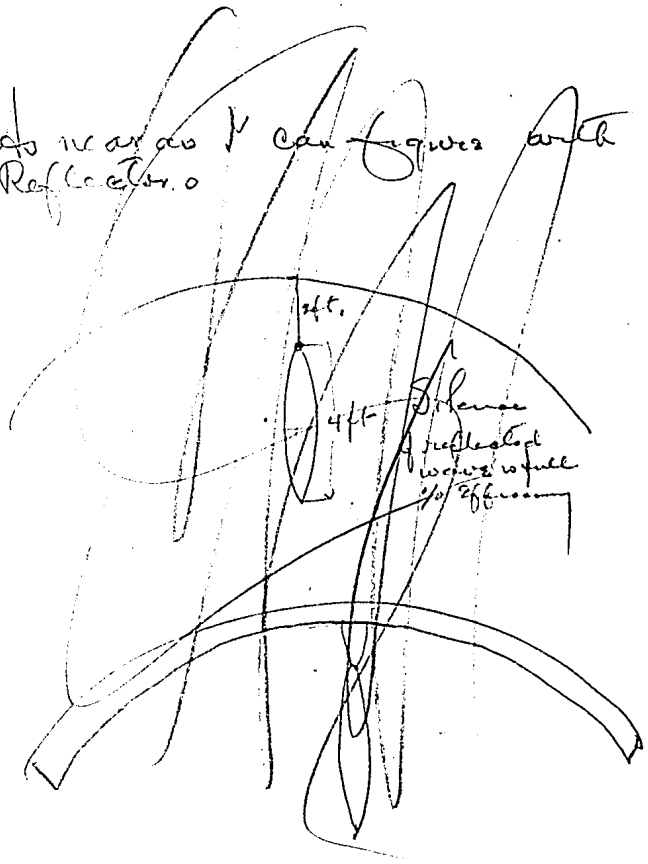
Possibly only one



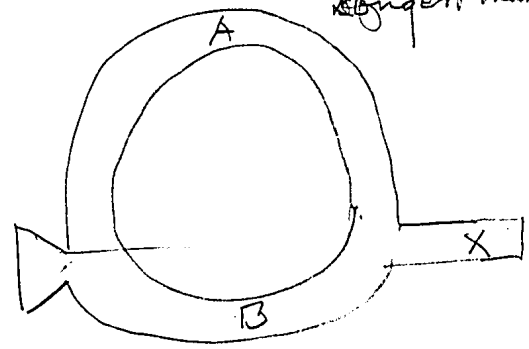
500/1000

350/1000

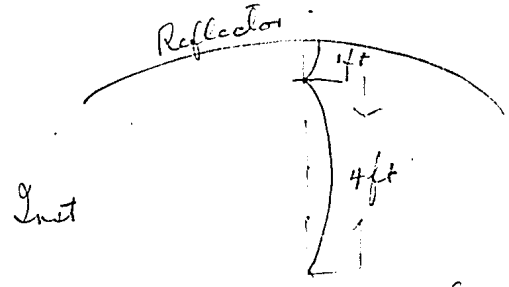
As near as I can figure with Reflector.



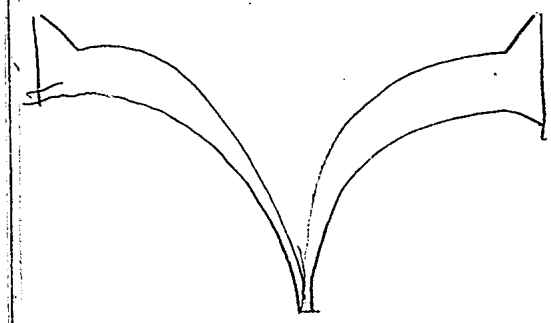
A 1/2 wave length longer than

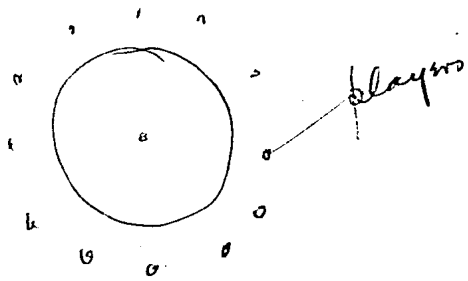


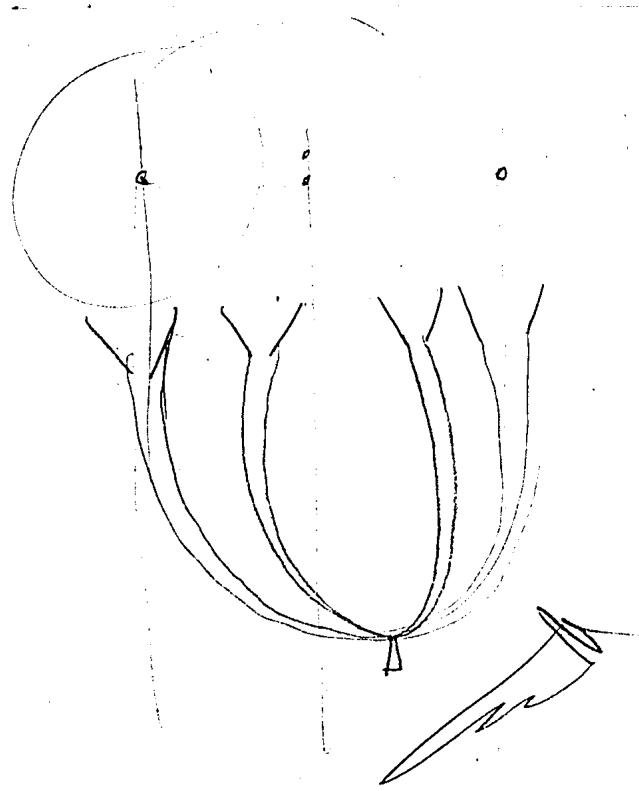
No Sound heard at X



If 2 + 4 or reflector from instrument 1/2 wave length get Silence — 1/4 w.l. or less — of 1/64 Vib Sec
~~Doubtful~~







Try Cork dia fastened at Edges, think can use it 1/16 or 1/32 thick + plug holes with wax, etc -

Test Chandlerons Wax records

Get his past tests, then go over all & pick out most attractive ones - purify all metals, filler good & then Turn & track for smoothness then rushwax & record with 100 thread & Reproducer to get vocal Electrical qualities, sticky surface Elo

Check Telephone
Look up in Note books past ideas on this subject

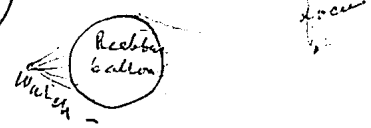
fuse Chloride Ca with Carbonate Na see if get finer Carbonate than by precipitation,

Get up good floating scheme to deliquidate or Mercur graphite & get it liquefied & clean —

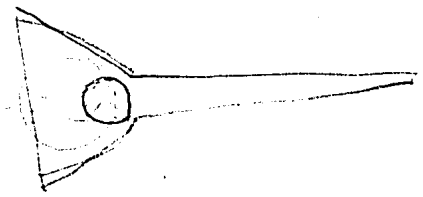
Tyndall Sound pg 9-

The strength of sound depends upon the density of the air in which the sound is generated hence in a steel chamber under air pressure! We could get much louder record
Cold room best for recording

Phono



The sound waves are retarded in thick part of balloon hence slowed; produces a focus —



Perhaps watch the wood ball in $250 Disc Gen produces focus — larger ball + Cotton.

Try Sulphate Na &
Sulphate Magnesia Anhyd
NaCl. – probably get
Ox Mag very fine –

Oxides of Fe, Ni Cd Cu
Sb, Co

Try Lithia Carbonate & only
weak water on chalk

Or Mixtures of Sr & Li Carbonate
precipitated together or
by fusion –

Perhaps KOH dissolved
in Glycerine will work
for washing Emg chalks

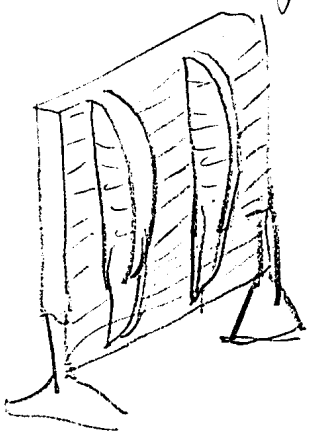
Harmonics increase in power
in a piano the harder the felt.
with hard body the first
overtone is 3 or 4 times
louder than the fundamental

Tyndal 122 page

Get Life or Note of
Whetstone in Library
Lots work on Ground

The Chalk for Emg
probably must be
Anhydrous. Insol
in Water or KOH

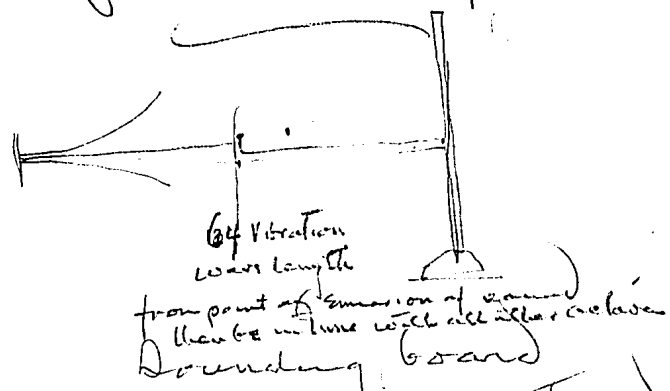
for sound reflection
Use Cast glass –



Etc –

Also – Sound board
with felt shutters on frame so
it can in 1 second be turned
into a reflecting board
to an absorbing no reflecting
board – a Continuous note
sounded with without
shutter will show change
of quality consequently leads to results

Experiment with singing
the Violin playing the
Melody except as an gov
Rings –
dittto & another Instrument
say harp to play
def – or ceccanigl –



must be picked in a Tuned
position.

The outer Channel of the
Ear responds to
Notes of a count
3000 per second
Dogs which howl to
Music are particularly
responsive to 3000 per
second —

Look out for it
perhaps its the
Sensor Company
or not the Cavity
or both —

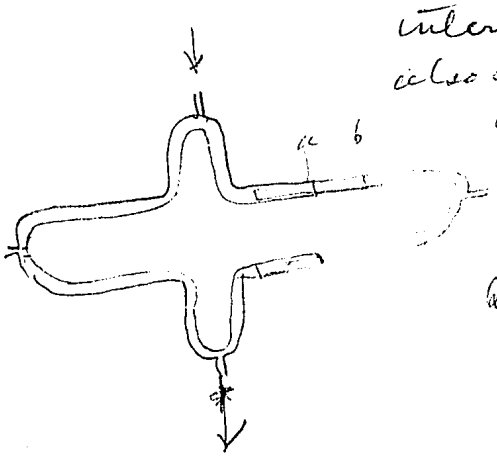
What alone says only way to transmit from a piano sound board is to place rod behind bridge at midway-locate & wire clamped to 1/10" dia or pine rod 1/2 to 5/8 dia.

The song with clad it was wrong —

Buy an old piano 50 to 75 for the sound board —

Make this —

Tyndal 261 —

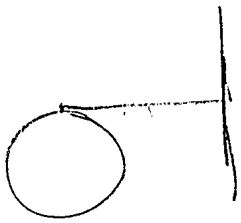


interference also a minimum wave length

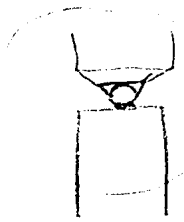
see details

Send for hangs Catalogue — West Elk [illegible] Firm

If we use hard Carbon in Transmitter with Disc receiver it will have very little movement
hence the Diaphram may have to be made larger due to exchange amplitude for power
If 4" used will get 4 times the previous or 1/2 the amplitude but of course Carbon used perhaps prevent leakage or diaphram will remove

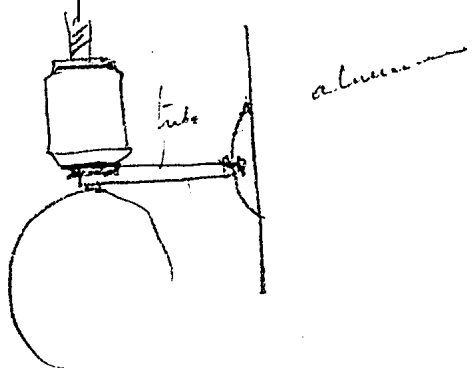


Think this should be tube to stop bending

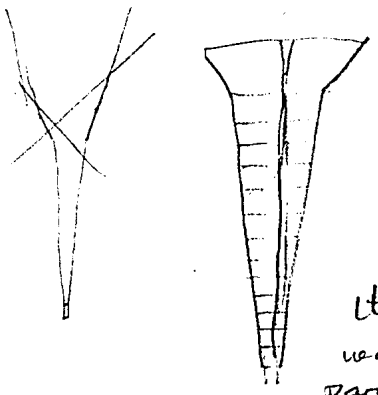


Should use a diamond tool to turn with very fine feed '2000 to inch — for Chalko

Diaphram should have a Cone

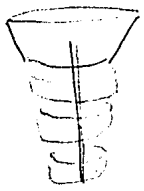


Think Aluminum or thin steel or perhaps glass



Throughout that funnel well became partially to way

Make funnel cut up in inch lengths then put together so .003 opening between each section



soldering strip

unperfect Column of air + reinforce something

perhaps a wound with flat band do same thing

leak where band edges come

Apparently should have air tight joints in phones work expectancy near recorder as a leak makes the long funnel at that point effectively ma enlarge to air to the high notes for instance a leak 1/16 inch from the diaphram well reinforces the 4th overtone of Middle C 3 of C'' 2nd of C''' + 1st overtone of 2048 C''''

Hunt up 2 or 3 old
Enclosed Rubber
Chalk telephones
used in England
for test of Length
time chalks would
seem OK as operate

Looking up old book found $SrCO_3$ 12 hours in water
3/4 lb. ~~[illegible]~~ washed coating - remark that
[illegible] ~~[illegible]~~ 2 or 3 drops

Try in moistening chalks
to dampen with
various liquids,

Water -
" a glycerine
" a KOH
" NaOH
" LiOH.

Try making a chalk of
mixtures of Ba Sr Ca
Carbonates —

In my old book I speak of
Tungstic acid as better for
Chalk than $BaCO_3$
takes lots KOH. & has less scratch
Says $SrCO_3$ twice as hard as
$BaCO_3$ or WO_3 —

Run Expts on WO_3 &
Tungstates,

I found 200 atmos press on
$SrCO_3$ cast, for the sake
of cylinder [illegible]

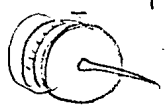
I mention that on WO_3
Cylinders permits use of
acids to wort, S S
Thus no big head ! !

Try MoO_3 + CrO_3 Molybdate
& Chromate - with
acids - Sulphate Barium
& precipitates the most in acids

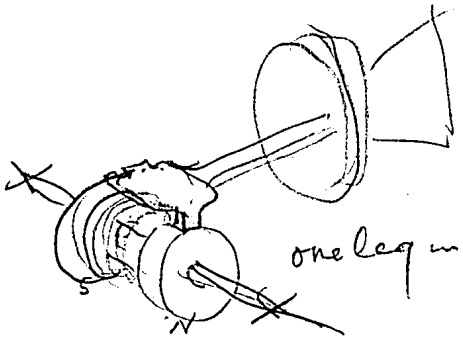
Try arsenates & fluorides

Make Eng cylinder of metal
~~[illegible]~~ many of them
then coat with films,
acetate & nitrocellulose
glues, fish glues, isinglass
& other colloids of various
films — silicate ka
sugar, dextrose
cellulose in LiCl, Ca or
Cu cellulose

Metallic with 1/8 wide
plate strip



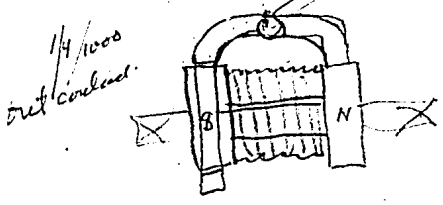
then can put
strips of paper
between pen & this & make
quick test of textures



one leg in Coil and

permanent mag

Magnetic Eng



Thread thru mass
& use blossomance

Emq - in theatre

Use the old Bizz

Dia use wood

& put it under

great tension like

a piano, to get it

Rapid — S

We always used big

Dia without tension

& they were dull &

flabby whereas under

great tension they

are as quick as the

smaller ones

Get Reynaults works on

sound of publication

in England -

It has lots of stuff in

& accurate

Says in Sir Crompton's

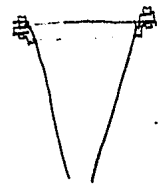
Gold Beaters Membrane

stretched across

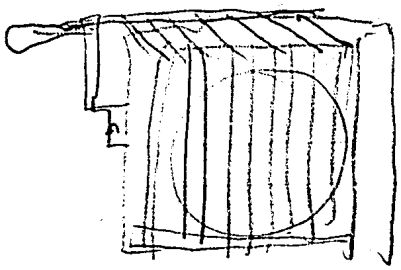
is more sensitive than without

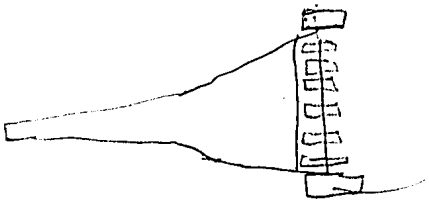
This is contrary to my Expts

Try it

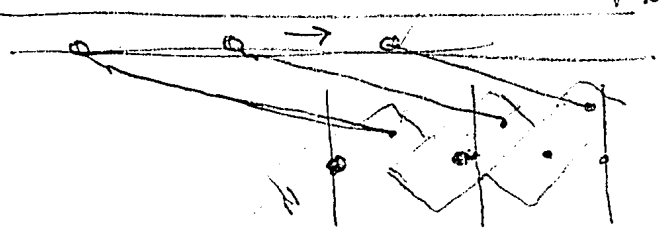


gold beater skin or Collodion

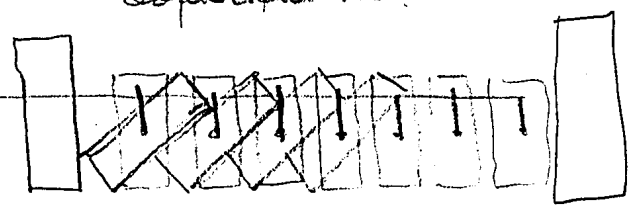


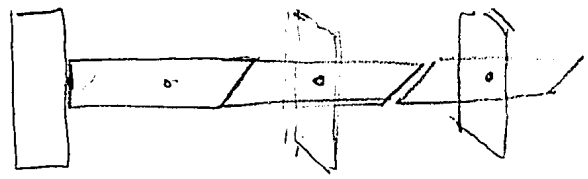


Thus can (by) on separate stand so not to Limit — distort sound in adjusting

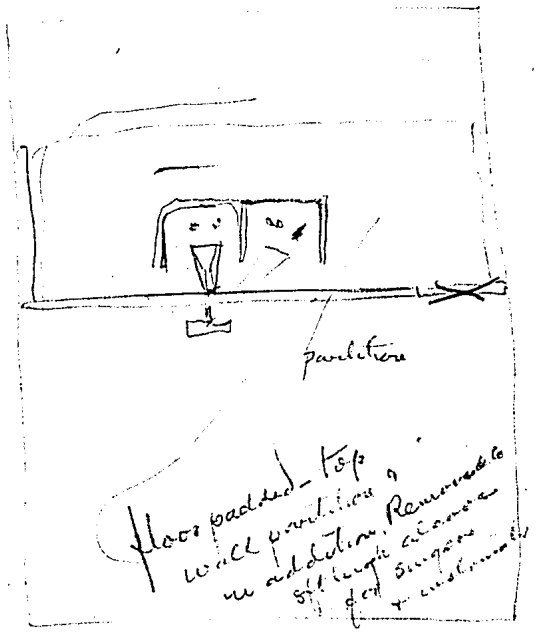


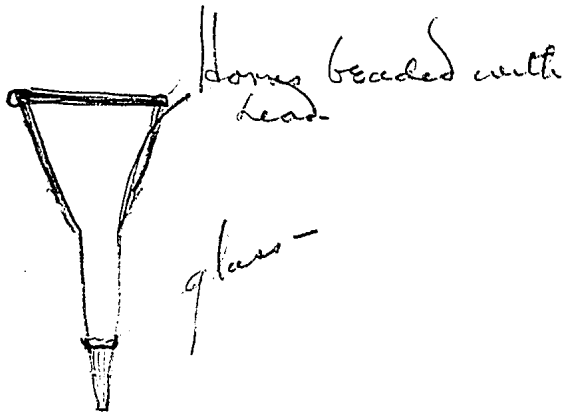
felt cheats <u>chiller</u> for modifying Volume of Opera sophisticated rooms

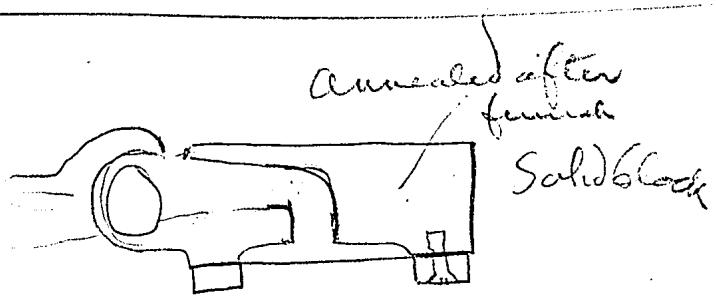




& so on felt about 1/4 thick Expt as to thickness







If aluminum diaphram used
Make box of aluminum
If steel use steel box

The Vic have no chatter marks -

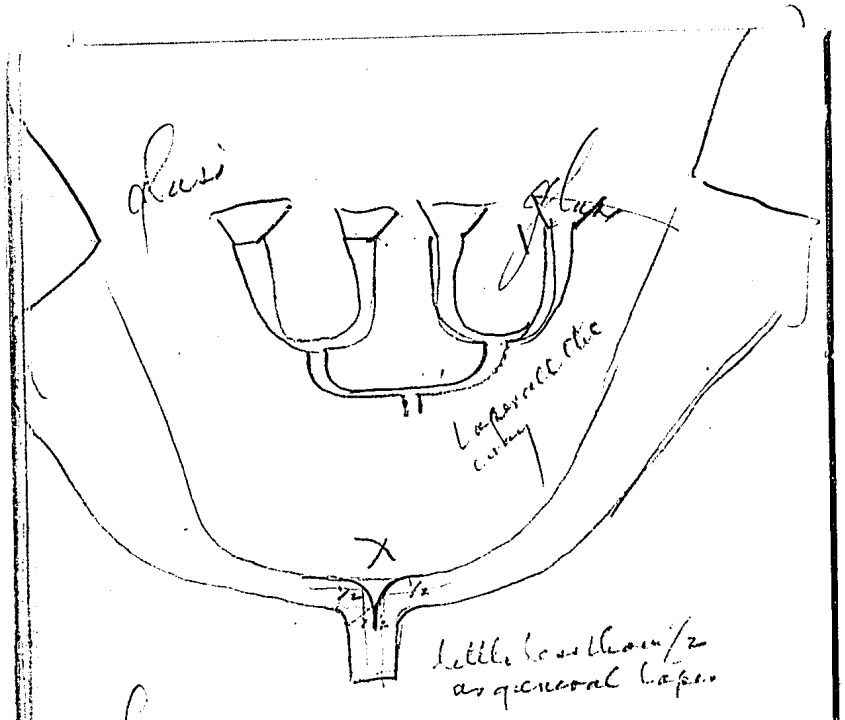
Suppose we try after record made in white wax to get a ball exact size of record temp say 1/2 or 1/4 smaller
Moment on reproducer weight lightened to weight 1/2 oz -
Then add long spring on to give pressure -
Then start disc and run at very slow say 2 Revolution per min this will polish down Chatter marks & Bring practically no weight or Mass but only spring pressure & very slow it will not hurt top waxes

Try grinding on Wells Celluloid with Vienna lime

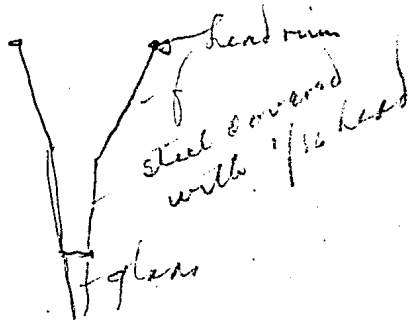
This is most practical & Can be done -

Try dipping Celluloid Point of Wells & Reg dip & sinkow -

also gradually heavy the Wells Celluloid & see if Chatter Caps bad spots -



Think this either U or W would allow as there is no Expansion at X to make a wrinkle + lose power



In case it is found that glass is best despite it will be necessary where fixed at Edge to make it larger in diam — This will reduce amplitude very much + only way is to increase the Knife hitching leverages. A glass box would probably have to be used or steel dehaches next to it on Expansion —

glass 00089 nearest,
Cast Iron 00100

Steel box
Nickel Sheet, etc

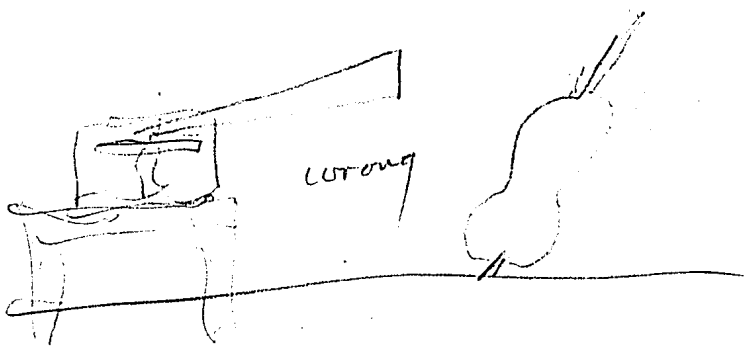
Wood has 1/2 the Expansion of Iron glass,

Perhaps paper Sea good with wood box

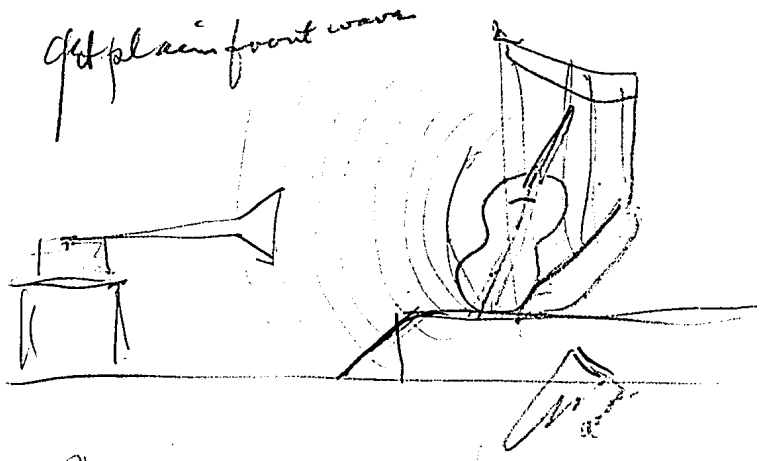
Porcelain less Expansion than anything — This is practical for a box

As I get the Ellg action
by rubbing finger over
X ray tube, & also
finger over a metal —

Perhaps Canned porcelain
or other fine grain porous
paper and they read at Ellg
instead of platinum &
Lithographic stone Cam be
highly polished & it might
act —



Get plain front wave



In piano the base & overtones
seem to be the trouble
or high register is abnormally
loud,

Uvanite dead on end
of hammer on low to get
slow!

Then looks as if to raise the fame
of low notes & diminish high
it would be larger dia
more inertia that dampens
the high & slow hammer to
get full swing bear this
in mind by fastening at
Edge & thick dia it would
limit vibration for strong
slow & choke high —

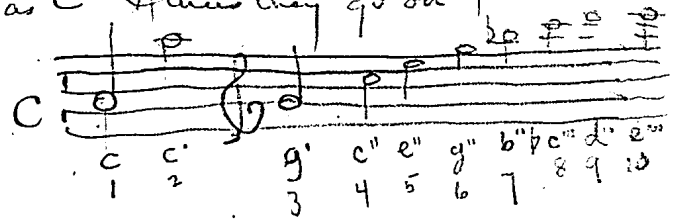
The 1st overtone is twice that of fundamental — If fundamental is called C then the 2 overtone wave will be C'

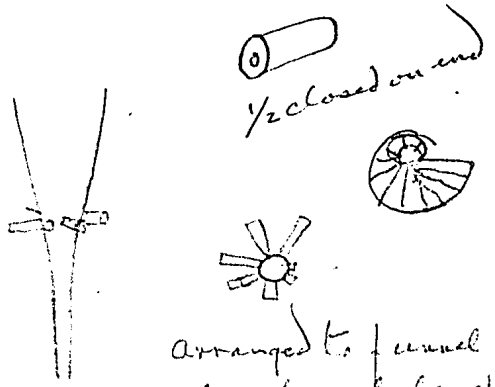
2nd overtone is the fifth of this octave or g' making three times as many vibrations as C

3rd overtone is the 2nd higher octave or C'' making 4 times the number of vibrations as C

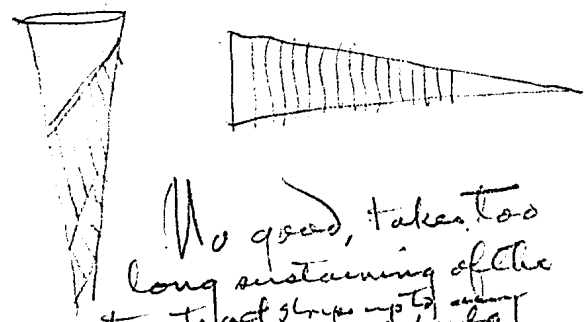
4th overtone is major third of this second higher octave or e'' having 5 times as many vibrations as C

5th overtone is the fifth of the 2nd higher octave, or g'' making 6 times as many vibrations as C & then they go on





arranged to funnel
only a fourth length –
so to strengthen upper tones
in voice & not the fundamental –
funnel for Coulrattis another
for Daphrania,



No good, takes too
long sustaining of the
tone to get strips up to
amplitude

Strip made of separate sheets –
Capable each of vibrating separately
& turned & wound up to make a
funnel –
Some strips so in tune with every
note just outside of minor
not much good for music

In above Connection only
an Column get quality up
tune as more in detail –

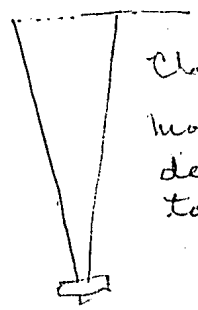
With a fork on resonant
box the waves up to spread
takes time, if one is only
1 vibration only the sound

Hence no hope for tuned funnels
etc except with air columns -
~~then there~~

Helmholtz page 67 -
says a diaphragm connected to a
bottle 6" long - diameter 1.93 dia
neck 11/16 diam
gives a certain fundamental
sound i.e. is in tone with
certain sound. Sand blown
through to edges,

a 2nd circle showed .75 inch
dia -

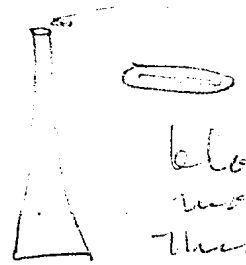
It may be we get some
bad notes when the
prime tone of our dia
is reached if not built up
built up dia is the best



Closing more and more the
mouth of the funnel
deepens more and more the
tone -

I think we could adjust
all our music by an
adjustment of capstans like
they use on a camera -
try this important

To find tone of funnel



gives no
overtones
at all -

blow across
mouth
this gives it

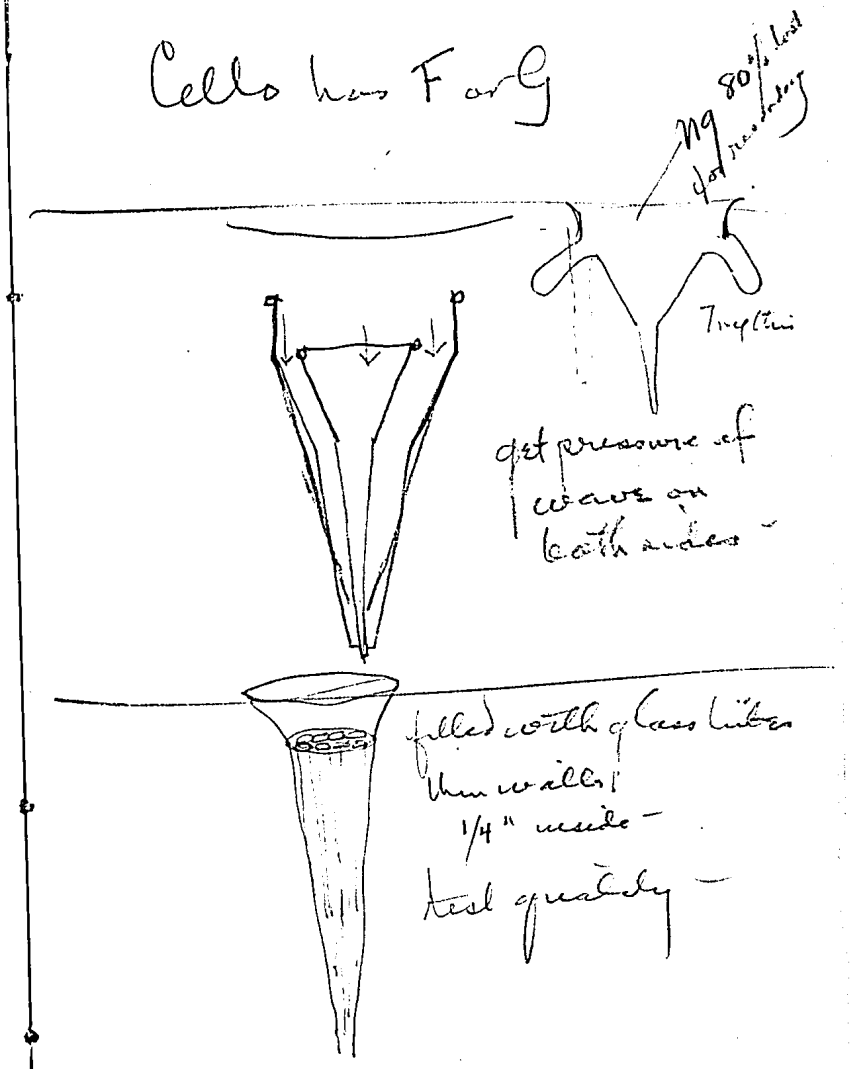
Helmholtz dampens Piano strings to form notes with finest Camel hair brushes (perhaps several against a Diapson when sounding the note)

Should try experiment of loading hammers of Piano with lead the amount of lead increasing as we go lower pitch - to get more power and effect low strings which are weak

Helmholtz says all Violins - have note effect same as Round Box

general C'
Walter Lockhart

Cello has F or G



perhaps when using a diaphram fastened at Edges the Diaphram should have greater Coef of Expansion than box

then both heated to 150 Fahr & fastened. The Contraction of dia would be greater than box & it would be drum tight. & we would not be troubled by dia getting of Lathe

It would be less sensitive at 60 than 70 Fahr & then in box of which temp Controlled to get any Accuracies we wished,

Cup & Diaphram Material

	Coef Expansion
Al Cast	·0022
Sto Cryst	·0011
Brass Cast	0017
Rolled Brass	0018
Copper	0015
Ebonite	0077
Flint Glass	0008
Iron Wrot	0011.6
" Cast	0010
Mg	0026
Ni	0012½
Pewter	0020
Porcelain	0003½
Silver	0019
Slate	0010
Steel	0011½
Zinc	0025
Zn 8 Sn 1	0026
Pine wood	00049

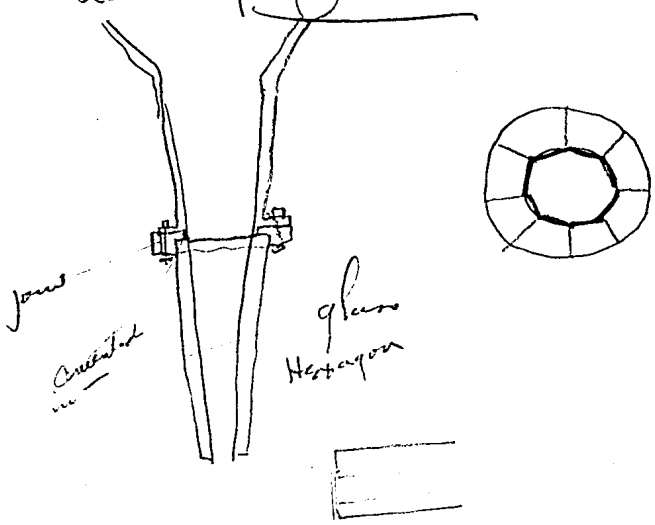
Looks like Steel or porcelain and Zn Mg Al or Hard Rubber Ag

Speculum Metal —

3 parts Copper 1 of Tin or a little Ceramic Very brittle,

Probably good for End of Funnels and takes very fine polish. Think its amorphous

Look up further —



Possibly Hard Coal Tar Pitch coated with film dope having Camphor in or not will deform under properly regulated heat & cool as substitute for Celluloid such mounting possibly other pitches also

~~Shellac~~ melted with Triphenylin embalmers very sensitive to heat perhaps can work direct with mica condensite — 1/8

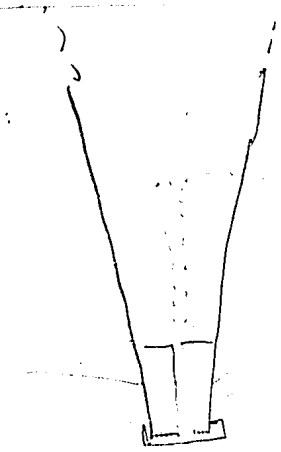
It is probable that the reason the other part of a disc record is not so clear & good as the Edison fashion is the knife due to higher velocity & thus weakens cross tones, & also of course to Edison rentable —

We should make so Expts on the friction of celluloid & cupler on dif waxes Easy done —

Another cause for loss of higher overtones is the pressure on the disc due to tracking.
With the advance call recorder the way that stresses the disc the least to give normal tracking will be the most sensitive —
This can also be easily tested using a recorder supported on knife edges only the old way & with constantly peaked or low deep it grooves by making wide wall width —

Some of the machine days may be safer wax & make them more amorphous —
Ditto, a large number of waxes

Make a test pure Stearine ~~with wax~~ as base



May need to straight Lathe Carbon

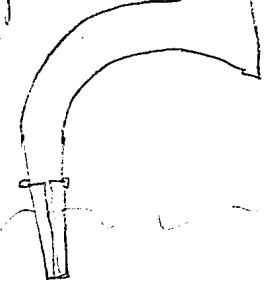
No diaphram —

Right kind funnel

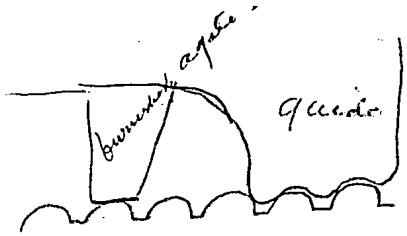
Split a la ... Just hardenable

+ filled with Carbonized charcoal def mesh —

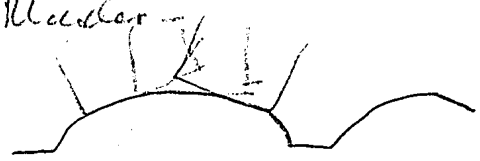
Sound waves compressers
Use Carbonized thread cut in 1/8 lengths + various other Carbon,



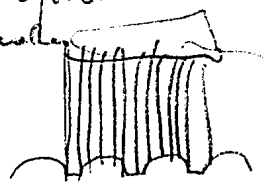
Let broken filaments from lamp



To burnish the Copper
or Z Reeds -



Gives a movement to the
burnisher



brush of 2/1000 or 1/1000 brass wire

quite Unique -

Take regulating 10 Key Reed
galvanized with brass or
Copper wire brush
Rough or not,

1st Theory of bremolo is unequal tension of the 2 Vocal chords

2nd Theory is vibration of the jaws throwing the air into vibration 1 to 5 times a second. If middle C we get 256 vibrations a ~~flow~~ a bremolo of 2 per second, the jaw vibrates twice a second - allowing the resonant C naturally or varying Val - or allowing the vowels into 128 tones -

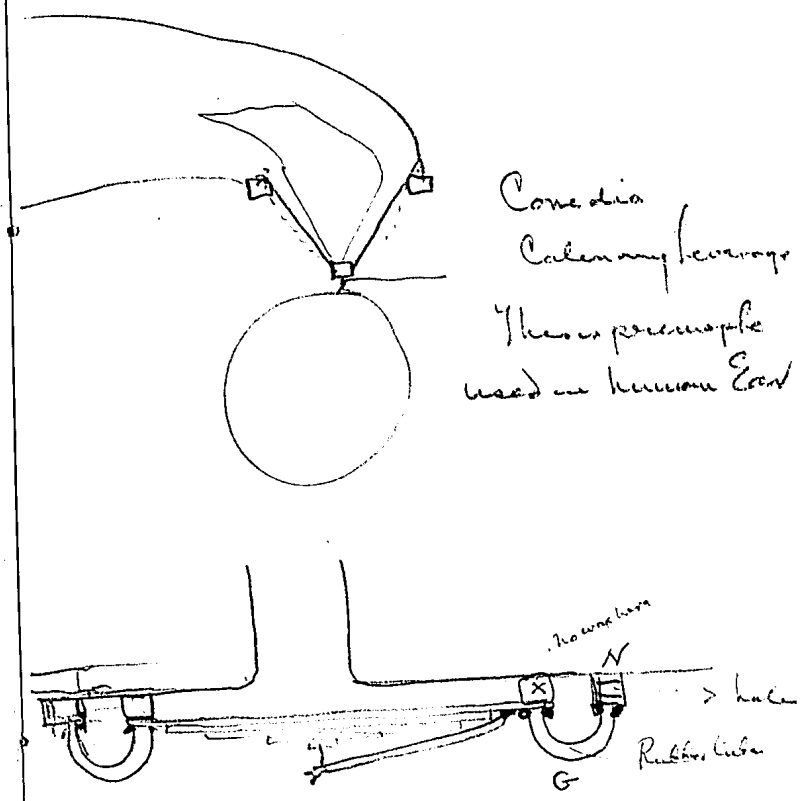
Hold the ~~jaw of a bremolo~~ singer & see if she ~~does~~

Try a song short & simple
sung with A then E then
I O & U, note notes
that have bremolo in
Each song if developed
then it must be vibration
or oral cavity

Helmholtz Say Ear is tuned to notes between e'''' & g''''
produce a feeling of pain in some Ears, if there is any overtone which affect this part of Ear its powerful

This is generally a area when voice is strained & it gives a screaming effect,

In powerful male voices ringing forte sounds like tinkling of small Bells



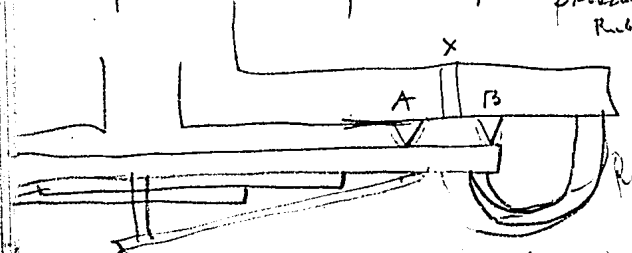
This kind of a skin moves usually as a whole & about like needle It held against a perfectly flat rubber X
N is a ring on which other leg G of a Rubber tube round; this ring has holes in

OVER

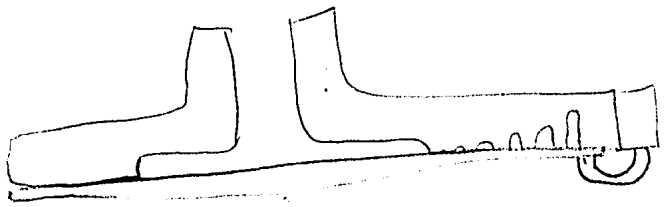
On waves coming the diaphm goes down as a whole + the pressure against X makes a leak of pressure the escaping air passing thru holes in N hence its amplitude is checked for high waves but not for low —

The rubber + disc must be carefully made + micro used in mfr.

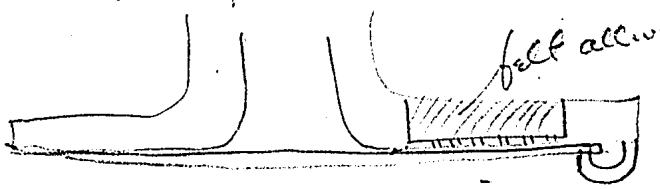
This idea can be worked up in many ways



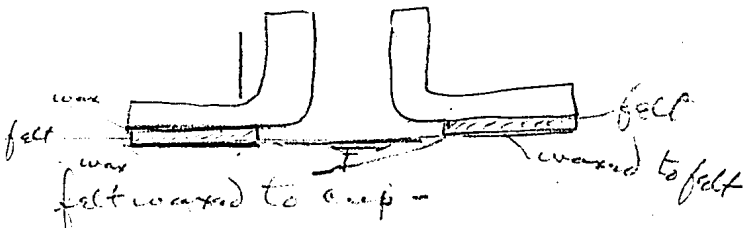
Disc on two edges slight downward movement of disc it leaves A + is carried by B — this lets air into chamber but A+B + prevents out of holes X



When it ~~[illegible]~~ moves + knife cutting a downward movement slightly of cyl disc a spring clip to a small groove around box effects more opens larger ones + as any thus limiting disc hole opener or closer

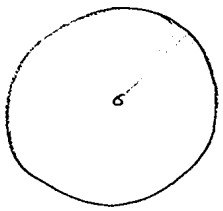


Another idea —



This makes a soft long lay 20 to 30% leak through felt 1/2" long

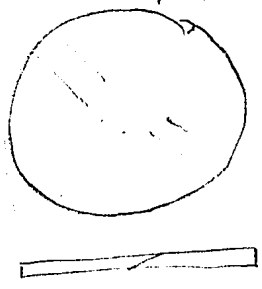
dia full size of clamp



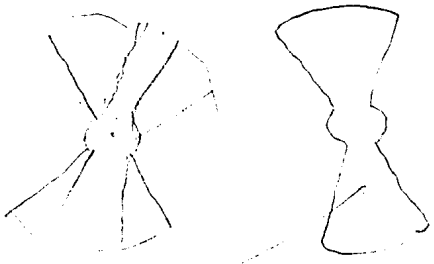
cut obliquely by a razor to center & used in place

Pressure just spread pressure on this with split rubber tube

This principle can be carried out in many ways



oblique cut



built up of sections like this paper, rubber, etc.

W. M. Hall thinks good results are only due to rubber & not to split diaphragm

6" pipes lined inside with
1 1/4 inch of Cowhair in bag
Cotton stop Echoes —

Try angle tube
6" made of Cowhair lining

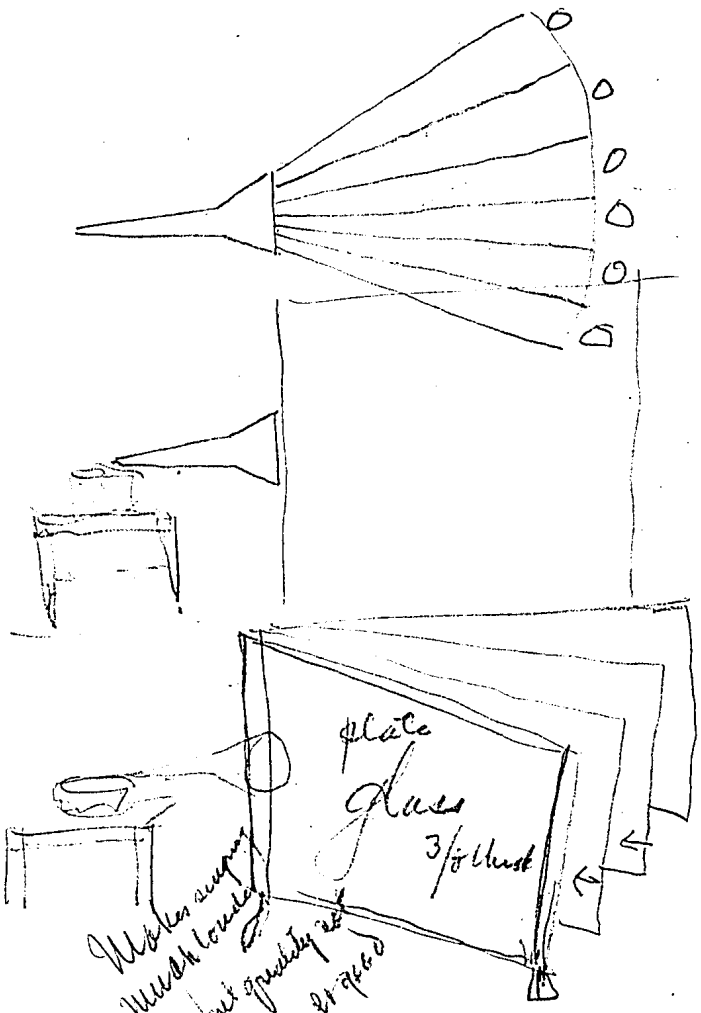
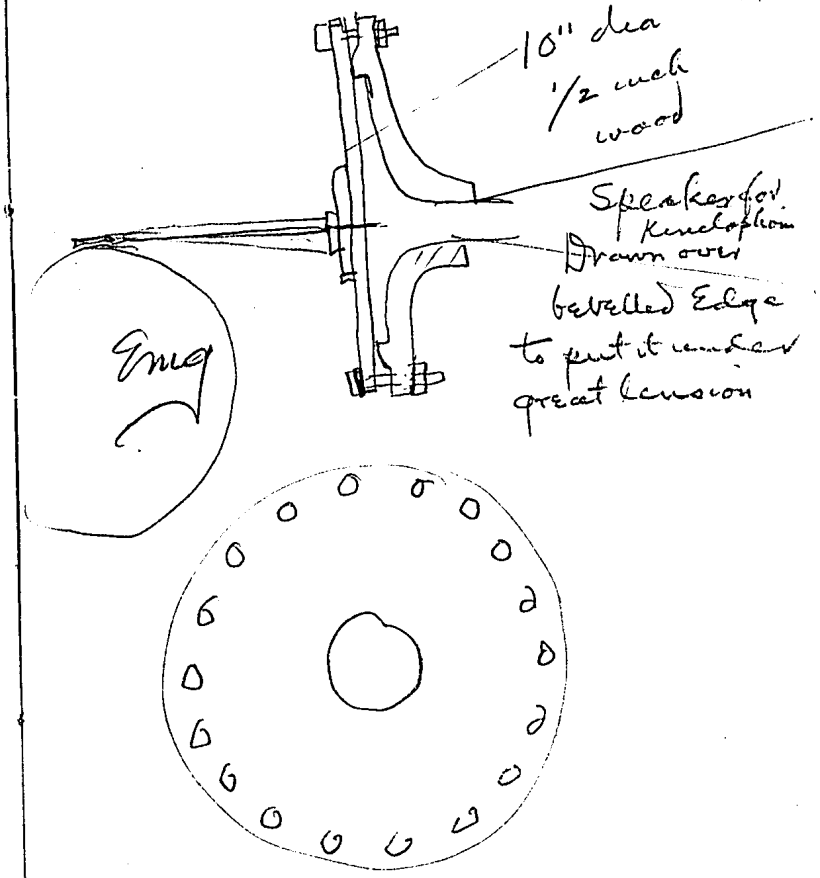
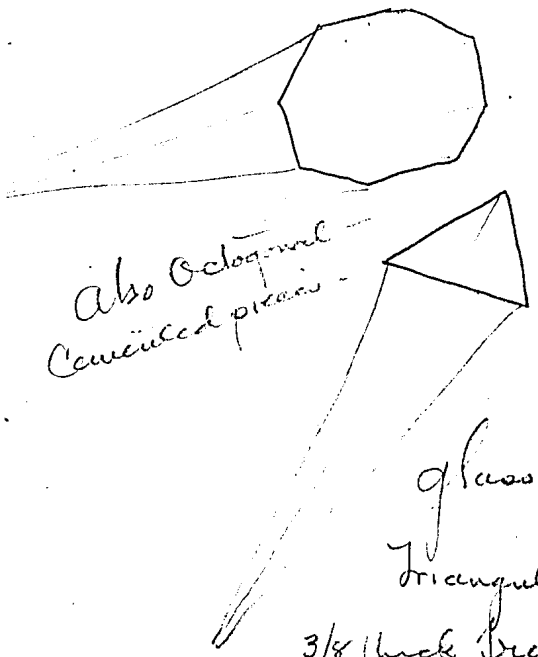
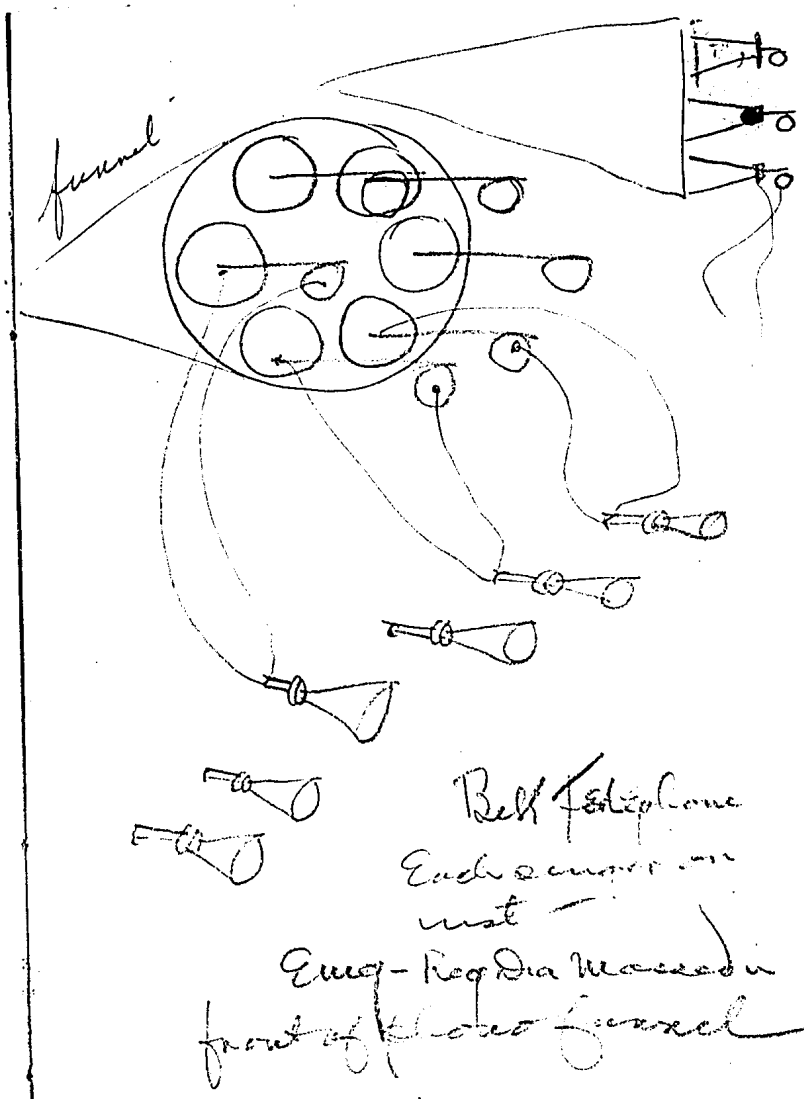
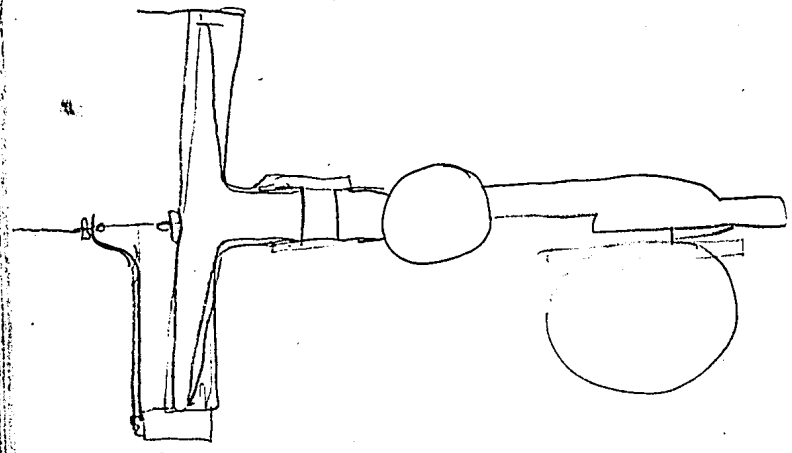


plate
glass
3/8 thick
Mirror surface
much larger
but quality of
glass

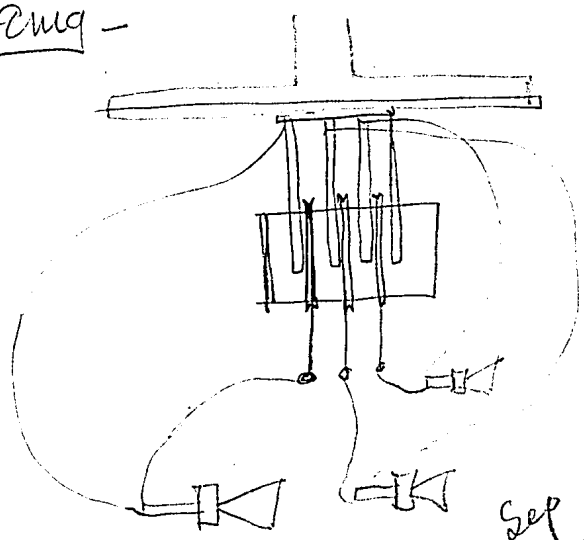

10" dia
1/2 inch
wood
Speaker for
Kinetophone
Drawn over
bevelled Edge
to put it under
great tension
Emg


also Octagonal
Cemented pieces -
glass funnel
Triangular
3/8 thick female plate
glass cemented -
None these necessary - for
funnels any get to have
Volume all need greatly
Can't say how greatly
vs with phone


funnel
Bell Telephone
Each a amplifier
mat -
Emery - Reg Dia Mounted in
front of Video Screen

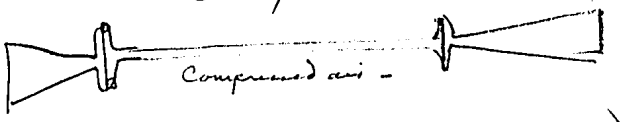


Emg –

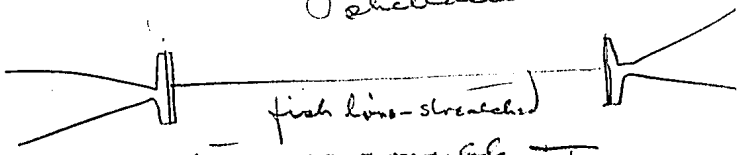


& so on Sep
Checkits work

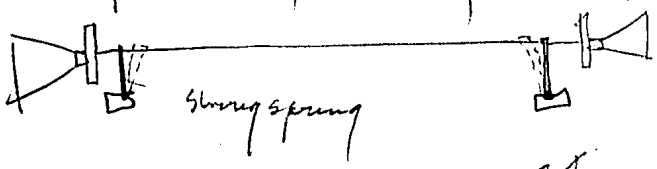
a 003 Copper steel wire 10 ft long
is same as a Cube 1/10 of an
inch, this is next / heavy loading

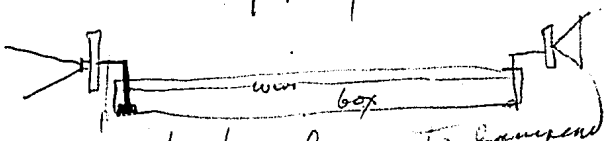


Cat gut, dumen thread
shellacked –



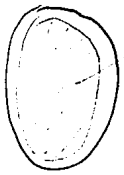
as strong as possible –
shellacked thick so it is soaked in
shellac & quite hot all over outside
5/1000 thick, then waves should
travel by longitudinal Vibrations
12 ft should be very light
weight. Necessary shellacked
very tight & assembly





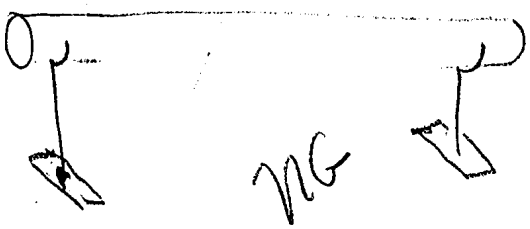
box has glycerine to compensate

It looks as if nearly all of a sound wave is absorbed by a bag of Cowhair inch thick

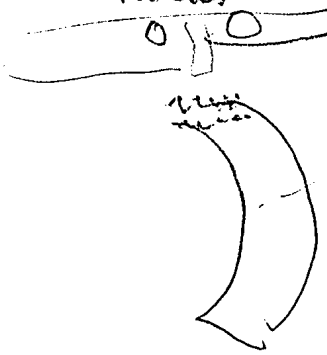


Sound waves would not rebound from Cowhair hence whole of the Energy should be absorbed in giving power to Dia —

In Recording room air can be got in (12) Vibulations thru few 6@10 ft 6X6 tubes lined Cowhair



Try 6" tubes of Drawing Board paper or Evan Thompson also Octagons with strips 8 so only sections of paper vibrate hence would be squeak that carry over 66 sound — stop Bell vibs —



Then we Tune with low notes

Try one made of metal from cooker 1½" diaphram for D Scale

It may be the reason we have
Valuin on low notes found
is that partitions funnel it
into parts in tune + give big
vibration to touch of fingers
this degrade the Energy
The funnel channel or chan
to low notes + everything
else in room — Piano top etc

Bel sound maybe due to
impact of sound in room
Especially low one +
possibly 10 ft long box will
ring maybe bel sound when
30 glass tubes each chan measured
together will not + val nal
much diminished probably
Brass tubes — the Bell
action will diminish as
diameter diminishes Even
120 ½ bore glass might do
better

Possibly = Wind instruments
Could have connected
to them Cavities like the
human Cavities + thus
give more overtones +
change quality of
instrument favorably

Put strip Cork under
bridge of Violin —

glass fibre bow for
Violin —

artificial Silk strings to
bow —

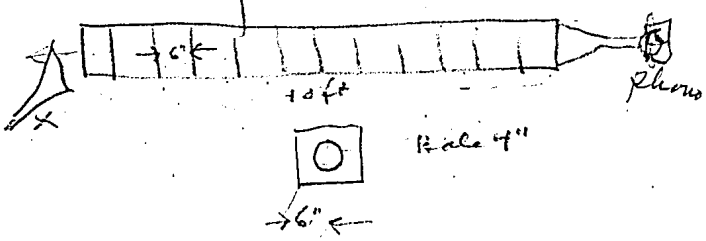
an Extra dead string
3 of them steel — to overstrain
the Violin — + not used to
play on — Cleaner recommended

Aluminum varnish on
Violins = also Sizal
also the fibre from aquavis
they used for thread in musics

Paint strings with Condensite Varnish a Rainbow for Violin —

Violin — Strings double like piano — steel strings —

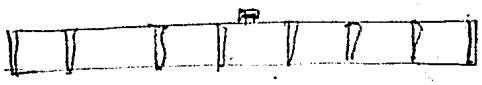
Tried today

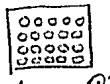


With all in scarcely hear anything with the partitions placed haphazard 6 of them no improvement but somewhat louder without partitions 1/2 the loudness with X found at end as it was with X in front req found

Noticed when No partitions + box had open heard scarcely any Base everything sharp no mellow or overtones, When had closed it was twice as loud & Base Came right out loud + mellow but higher notes Thin + tinsley —

Shows whirls are bad — also 10" 6" wood box Cuts Violin down more than 1/2 = It didn't show much barrel sound — The whole trouble is friction,





End piece — ~~or~~ 5 Scraps

with thin Celluloid + 50 lbs pressure in 10 ft tube 6" made or can use 6 inch pipe —
Think of tube polished would be very little loss sound —

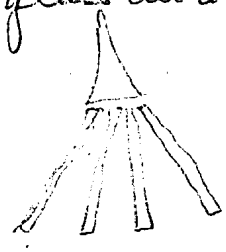
Tried today Feby 10 1914
24 tubes brass 1 9/16 made
diam 1/16 wall (about) 12 ft 6" long

The Volume when listening with funnel was about 1/2 that when funnel was in front of phono funnel

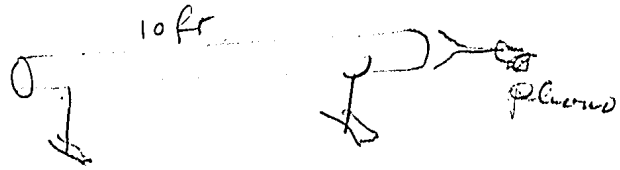
Very much louder than 6" box with one or 2 sections in —
The Quality was OK. Fireman spoke in air gave 1/2 the strength thru air as when he spoke in funnel Voice sharp in air + Mellow in funnel — apparently Very little muffled + no echo or other swell + about same muffled as Humphrey talks + is more favorable for music & singing than otherwise
I can't feel any Vibration of tubes — phonograph in sound with it — it was sweet toned no tinnel sound

Think could go 15 @ 20 ft.

This probably be better with glass tubes 1/8 wall —



1 funnel 4 sections of tube
or 2 funnels makes 8 or 32 performer



Tried drawing paper 6" dia
Listened with funnel dia
it acts about same as 6 x 6"
but shade louder I think
its sharp + poor,
The 24 brass is mellower far
superior for our purpose but
only 1/2 ~~[illegible]~~ to 3/4 the loudness
but I think glass will
increase volume —

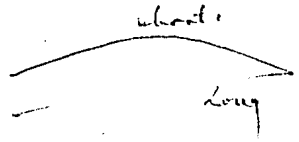
Ft Myers Mch 15 1914

Interpose in duct circuit
— EMG check ckt if much
internal movement in
Carbon Contacts

A funnel to record; B
funnel closed at small end
The walls of A funnel
are neutralized + should
not vibrate producing
B walls are strong

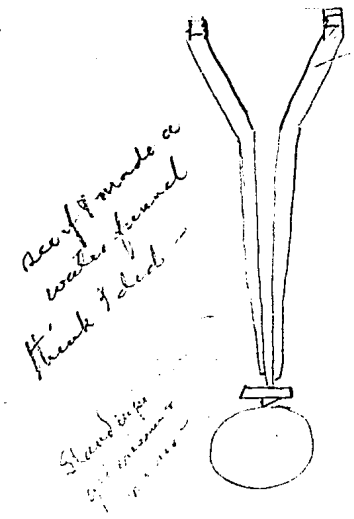
to get perfect neutralizing
End of B closed also lined
a Diaphragm

I notice in Explanatory talk articulation is better to me on last 1/2 of record than first, also the singing + music is better, — This seems to show that overtones + hissing waves are less audible on long than short grooves

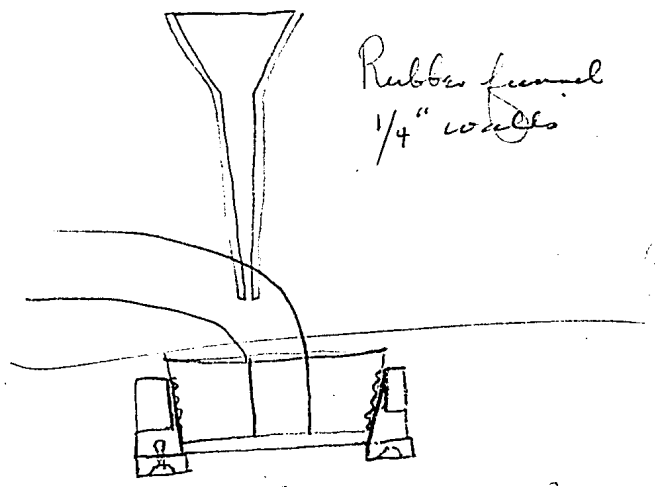


Also it is noticed that on tracked blank has a smooth surface with few scraps — But section reveals how it is rough and lots scraps This due either to vibrations given The Sound box itself by the waves blows Or the displacement due to music displaces unequally or makes these rough surfaces which are not given when regular displacement takes place or are interference breaking or wax chips

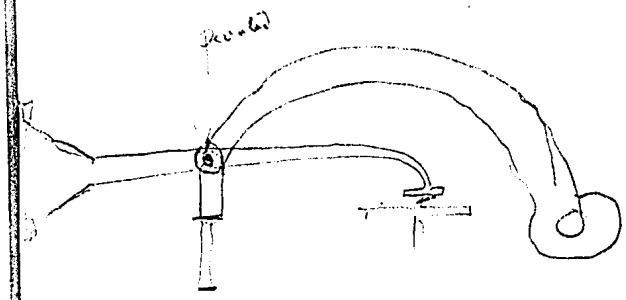
It is noticed in the plating + Reg technique of 1914 Jany to March that surface is smoother first point of record than the last a reversal of all on matter previously



The 66 Around increases as diameter of tube increases — Get very thick Shelby tube 4" or 5" long it, polished inside. ½ to 1" walls of possible — Also Cast iron 1" thick — 2 together 12 ft polished inside, 4 or 5 inch inside —



Taper walls to spread holding ring where Dia decreased at Edges to overcome heat expansion
Try variations thru Oahama —



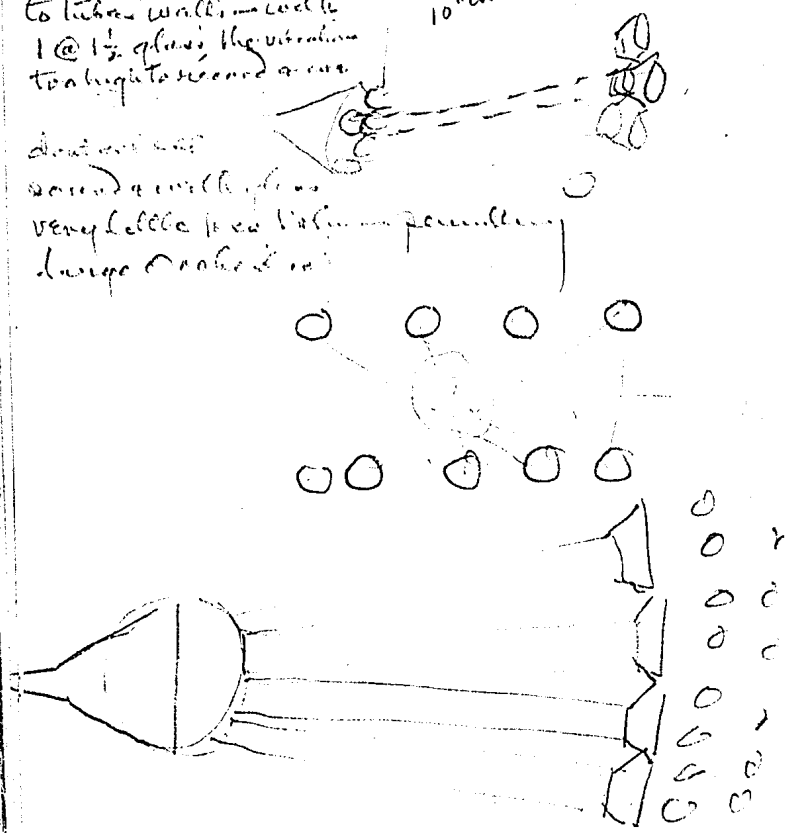
We should fix pump hammer to reduce vacuum high water or low water will be Locator or give proper Eval ...

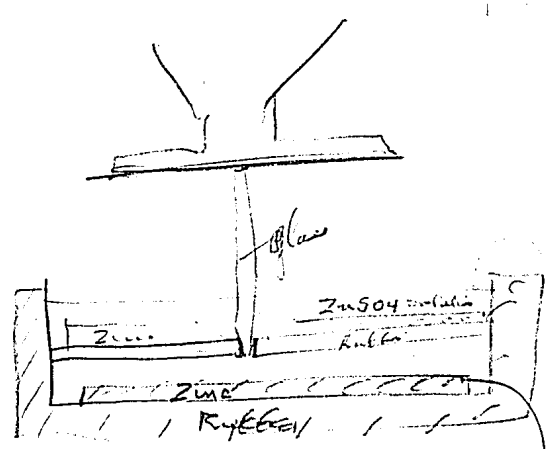
Pneumatic -

Evidently after [illegible] of Barrel sound is drawn to tubes walls in cavity 1 @ 1½ glass; the vibration too high to record or use.

10 to 12 ft
1½" glass to center
10" wrench [illegible] straight
Hundred walls

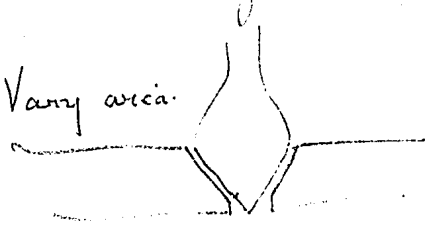
[illegible]
[illegible] wall glass
very little [illegible] vibration [illegible]
[illegible]



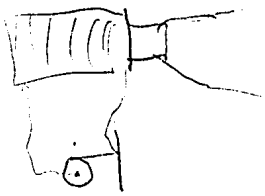


Electrolytic Telephone

Vary area.



Direct or thru Coil -
Magnetic or Relay Circuit

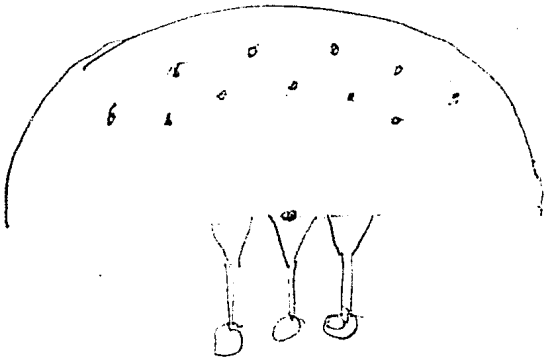


-|-|-|-

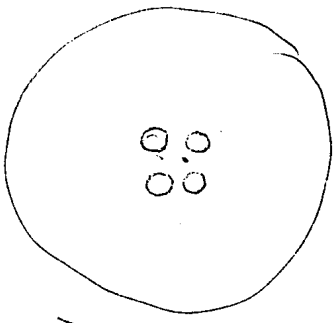
The colder the room temp for recording the greater the volume of air is more dense & the more movement of a dia-phragm stronger results, in a vacuum there would be no sound waves with the most ordinary voice there might be with much movement

The power the funnel confers is as a conductor for heat the better, the condensation waves is it receives heat or cold is affected accordingly.
Concave is preferably best
Wood, or Metal the best material & heat from ground cannot to approach or growing Resonance —

Wood & Varnish like music Master
Horn using good test shows its loudest of all the 42 funnels for recording — 9 ft away from a Dric

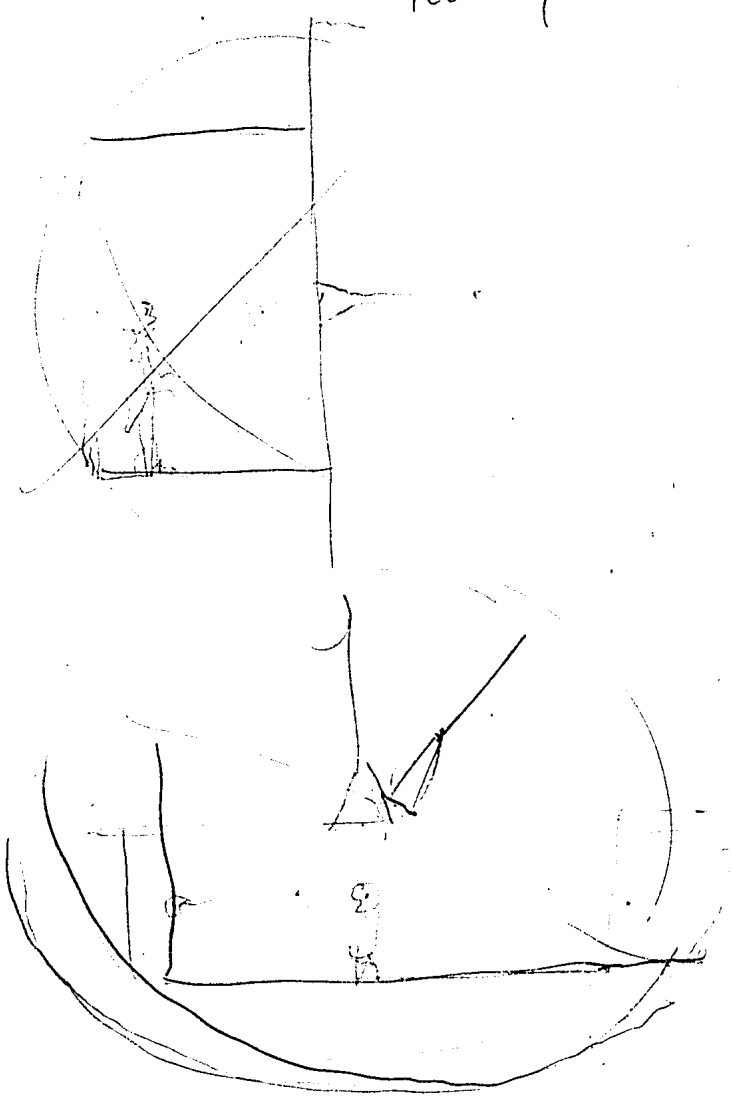


Think with the Reflector & Records equally 4 - 2 top 2 below can be taken at same time —

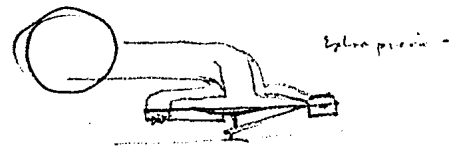


4 would be better as can have a man at each

Kinetophone —



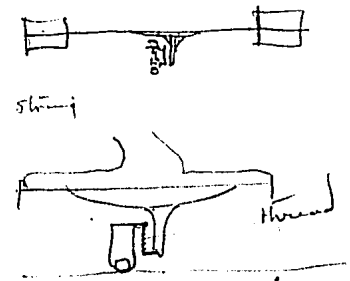
1" celluloid dia fastened at Edges —



spring to bow dia upward so it wont jump out when sensitively adjusted — Old style's free at edges has no limit & must jump out if sensitive, Only use spring so it bows it just enough & no Excess —

Perhaps if Knife holder fastened to rim & not to dia. it could bow diaphm upwards enough to prevent jump out

also



Cant jump out.

Films for Recorder with
Diaphm fastened around
Edge

Hyatts silk
Collodion
Acetylcellulose
Silk cloth Collodionized or shellacked
Gold beaters skin
Fish bladder
Animal membranes generally
Glass glass sheets blown by Daly
Rubber stretched to limit
Disc Varnish Pecula & Para taken from
plate hot or use Sesame oil -
Paper - plain Collodionized or shellacked
Mica
Nickel 1/4 in - by Electrolysis
Sesame & Silicate Soda
Linen Collodionized, gutta hot rolled,
Shellacked etc.

If animal porous membranes
used in recorder, fills pores
with gelatin, fish glue with glycerine
so sound will go where water
goes or diminish volume

When piano is used strip it
of the case & all parts that
will echo the sound waves
from other instruments
& in Reflector put it in
various positions to get best
Effect.

Quartette Regoletto

Each singer has telephone Ear pieces connected with telephone a clarionette plays the melody The leader who has telephone Cap gives the time or rythm all singers sing to Clarionette & Correct tone by it to get no beats No singer hear any other singer —

Above Ng

Navy Oct 25/16

Using Radiant heat covers some hot smoke stack of Dreadnaught to act on a tempy on a focus — Or Thermopile with galv or telephone receiving Current intermitted

Photography send out a stream of light as powerful as possible down an arc with practical amount of ultra red. Pass Green Blue Indigo or other combination for visible light — Use very sensitive plate with reflecting lens order to bring to a second focus demonstrate the plate with sequence or Cyanical, that now known — Continue Experiments to discover fast more sensitive Dye for photography Infra red.

Rock salt lens or Fluor Spar

at 100° heat the waves are 92% pure Rock salt 54 Sodium Sulfur 33% Fluor spar, 20 other things — Synthetic table spar 3% [illegible] processing

Opaqueness to 100° radiant heat depends upon the thickness of opaque substance are made very thick they may approach Rock salt in transparency –

The water vapor in the atmosphere is going to be a bug in working infra red at a distance –
low humidity will be favorable

In machine guns after Charge Explodes Explode Capsule Solid CO_2 or liquid air To Cool gun.
or water jacket water fed with Solid CO_2 ~~[illegible]~~ Think most practical is water Cooling ~~[illegible]~~ minimum pump circulating thru a small sub cooler if large area radiation to ~~[illegible]~~ gun barrell. poly Chl use record powder

It is probable that there are atmospheric conditions which always appear. Colored to us which of made in absolute darkness for light & radiant heat & low temp that they would not darken a mirror exceed a Bryan scanlan Moore tube or Infra red & yet could take photo in the dark & detect warm ships at a great distance in inky blackness of night

Think on nights which are clear & only lighting stars that an extra sensitiveness of tube & reflector that ordinary light could be used to see first ships at distance.

Another Scheme is to send out very powerful sound waves 4 to 5 per second below audibility – These waves strike ship & reflect back – long cylinder is turned to these waves. & listening tubes used with a revolving ulterminller to break up the waves into 256 per second or higher after they leave over

Iodide (red) of Hg changes color with heat, turns yellow

Infra is absorbed by water, hence fogs

glass is practically opaque
while rock Salt, CS, Chloride
of phosphorus passes infra freely

Detecting Marsh gas

Take advantage of the greater absorption of 100° Centigr Marsh gas for incident heat than dry air —
Use thermo & bridge method —
Air (dry) absorbs 1 while Marsh gas 403 times more
Ammonia has 1195 —
But relative absorption there 1 inch is air 1 — Olefiant gas 6030,
Sulphurous Acid gas 6480
adding 2" dont increase in percepti as ray from 1st inch reaching you then 2nd "

The time elapsed between time waves sent out say as shown on the sectoon gives the distance of the ship —

Another way is to work my aeroplane torpedoes containing a charge of magnesium powder & with a very powerful smoke gun send it the greatest distance possible & explode & light the powder — at same time on top of vessel have Telephotographic lenses & most sensitive big grain Emulsion plates or photo with the Erich vessel heat the hydrogen —

Say high speed (40 miles) small craft could be sent out to do this say 300 miles or more a sideline could be used

Think in clear nights by using only the photographic rays which are nearly invisible & not using a beam or searchlight use several beams to give general defusion so enemy would not notice it that we can photograph a dreadnaught

at 5 or more miles if we use a
Special large grain sensitive plate.
perhaps a generally diffused blue
& violet rays could be used,
+ Exposure of 1 minute or less.

Special flypaper or bindline & paper
bits for spraying ground on retreat
Delayer -
Ditto a Mechanical delayer like a lot of
wheelbarrows operated from 2nd Trench -

Try Experiment of how Efficient a 1½"
Cowhair pads over the Ears in -
m Cannon work.

~~[illegible]~~ boomerange photogh Camera
to go over Enemys trenches &
sweep around back - may not
be hit or noticed - move
swift.

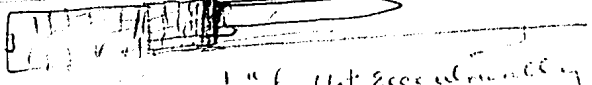
Electric boring Mole device for boring to close by Grenelup a preparing of Chlorine, Etc
The chlorine under pressure when break thru gas reaches in heavy explosion connected — 5" hole It would strike the deeper or rest sections.
a non-combustible gas would be better, Gas on expensive proportions better probably — only it would do
with 25 per mile some should Example nature & fell lower be when with Explosive gas, They would probably have a fire or smoking or an open light,
We could protect by shield till they get into the Tank,

If ground proper could use double pipe & water to make hole,

A large wheel 3 ft face
6 ft dia filled with gas or
Dynamite, propelled by a dynamo below
the ground + with Electric Motor
Jaunting out a small insulated
wire the wheel not penetrable
by bullets + moving too fast
for guns at Exploded over
or near trench,

Also an incline up which wheel
rolls + sent without motor but
Collapsible if trench not far
apart, unrolling + unwound +
fired by perisscope,

Short range rocket



1/8" bullet accelerating

fastened to disk
The disk would slope while
bullet would rotate on the
Eccentric axis + produce a sine
Effect on larger bullet, Thus ~~[illegible]~~
1/2 dozen times as much ammunition
could be carried.

Powerful arc light in daytime
might be an aid to vision for
Spelling periscope -

~~Q/ Bomb~~ Many revolving mirror
through many deflections of the
Quin for all kinds of directions
along the horizon in bright day
light bright pingle the periscope
then or he would be confused

If a beam strock his periscope
glass it would be deflected
Stack + reveal his position

Bomb - make it somewhat well
fine teeth - use an inclined board
teeth in the Bombering Corridor
bomb - Hold bomb off + on by
Sure Rod Illin Second Motor
or hand machine, Key drops it
on board shaft up incline
+ Collapsible over on the
Ingredients - then would be
lighter + simpler than
proposed wheel

Photo plate may possibly be made more sensitive by electric heat reverse current to heat emulsion

Possibly a 300 to 500 telescope pipe with rainy water proofing 4 dia used as periscope 6 ft used.

Aeroplane propeller to go to limit of vision from lower mast on dirigible which on lighting on water ignites Magnesium powder to ascertain vicinity of ships — also Calcium Carbide + Carbon to ignite it throwing many as vision over wide horizon possible as suggested in Dramock Lines —

Try the Grand Lucas telephone used years ago for intership intercommunication —

ditto air compressor pipe system of disposable bombs — lead wire

Hand telephone —

5 wire, write & send respondence
Communication as fast as can write

From ship to ship — Tube communication
Think they make porcelain lined tubes — —

A good Al smoke producer is going to be handy —

ditto a tracer for projectiles — smoke —

Any battery used in a turret should be in an explosion box

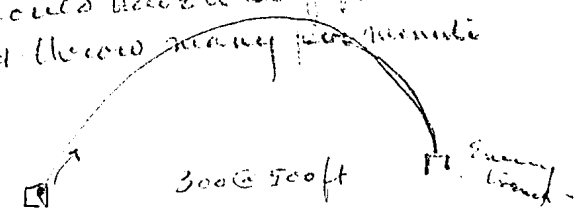
Why not correct the droop of a gun by a tracer plate — this would help expansion & prevention of shaking —

The lining of a gun after boring should be mechanically reamed & then bored & rifled — I am not sure but that it should be hardened —

Try experiments by passing solid shot through a tube, reamed & unreamed, hardened or not hardened — this will give a rough idea

The Ethereal force (sic) now Hertz? of the dynamos on war ship may be a source of danger as a loop formed or a pole or wire rubbed against here may give a spark — Try —

Throwing bombs tubes with side pockets using gasoline — say 4 feet long keeping up the pressure during release shake probably Petroleum & Naphtha or Pat Benzine better or Kerosene — Benzol Alcohol — piston used with cupped rod extending thru end of cylinder with extension guide for bomb — use compression to clap — Could have a self feeder on a thrower many per minute



The kind of trajectory should be pretty accurate. pockets + angle control direction of trajectory —

Right angle or communicating trenches should have board or sheet iron bottom with shrapnel battery car + cars to bring up men + return wounded cars go back with ammunition + food — also bring up ammunition + food — & wants good speed — probably grooves in boards to guide

Motor trucks should be designed to go over hills ploughed fields, stumps butt away fences + make good time + not depend on roads at all — going thru woods, a tree sawing truck should cut away the trees fall + remove leaving stumps say 1½ or 2 ft + the freg trucks should follow gardening after these stumps —

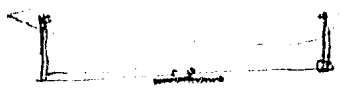
Cantaccuzeny Hypoxcelfetaxodes atomizers would clear the air of Chlorine of Every made have one on large trucks ready — Kill it before reaches trenches —

Tear producers can be taken care of by neolocallum Extremely Painful but never kills sticking plaster.

If the Rock of Gibraltar is of any Value why is not the Navesink Monument at Sandy Hook

With a harpoon gun throw a lasso with 25 or even 100 ft loop over a periscope with a quick power driven return to hitch loop + draw to pull off periscope

As a whitehead torpedo approaches the steamer force a hoop with various devices of diverting Explosive bomb to divert its course or explode it,



two arms with fine cure loaded Cable Connecting a heavy iron plate under water, when torpedo is seen work motor to bring plate in its path to Explode it - say 25 ft from boat This can be guided quicker than torpedo can reach

Run up from the floating mast a pipe like water pipe only very light or 150 ft beyond top-sailes put a periscope for observation

At sea 50 or more miles out lay small cables with ~~two~~ microphones strung along every 500 ft & resting on bottom, say 600 to 1000 ft deep. 20 miles each way from end of a local cable. If a Government line miles long will require 15 stations, no float could pass without be known a number of whaps & position 6500 phones

Think position of a ship by sound of propeller Could be triangulated & torpedo fired without a periscope.

Think Mines Could be strung along Coast 50 miles or less out & controlled by Cables & fired by a Submarine.

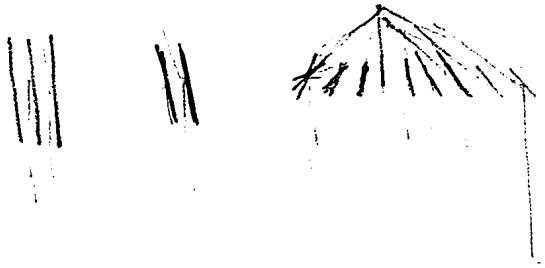
Can a gyroscope be made to guide a small balloon with Camera — when out a certain distance by a time clock stop one & start another gyro to bring it back.

Study up the Range finders — & the glasses they use

Can a special small gun 2" be made to ~~fire~~ prove the range by making a hit giving on striking an enormous amount of dense dazzling white smoke & forming rapidly. If the characteristics of this gun is accurately known the big gun should score hits from actual experiments

Why not make a very small machine gun with a removable brass chamber into which from a coil lead wire is fed using 1/8" bullet, this is cut off & from a coil smokeless powder is fed in & cut off — the record used to feed — when removable brass bush is worn, remove it use the space from powder to compress air to cool the gun —

After the feed so more or less of the powder tape or cord is cut off according to the range —



4500 3000

- 7 -

3 1/2 hour

1.14 Rev sec

now 30 sec to Rev

or 25 times slower

800 leaves sec

only 32 waves

2.7 800 (32

3.6 135 108 272 (38

38

38

4 300 75 225

200 cat 1200 400

100 fox 2500 2 24

500 375 2500

4075 3125

4 3 1 revenue

4.5

3.9 c Rev

.6

1500 125 375

3125

400 300 1200 800

5.1

3.9

1.2

3.12 cents each

400) 3125 (3.9

2400

7250

800) 4075 (5.1

4000

75

200

100 cotton

400 check

400

200

600

300

1100

25

3600

300

400

100

800

800) 3600 (4.5

3200

400